Crime Basket Analysis

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Crime and Justice System Analysis

- Historically, crime analysts and criminal case operations analysts have been limited by small and impoverished data sets.
- The development of comprehensive digital records management systems have created big and rich data sets.
  - Limited computational power remains an impediment to analysis of big data for most justice analysts.
  - Few conceptual approaches to analysis of big justice data have been developed to date.
- We propose *crime baskets* as a useful approach to understanding big justice data.
Events and Baskets of Attributes

- Events are occurrences in space time
- Events dealt with by the justice system have two aspects:
  - A Person aspect
  - A Case aspect
- Both aspects have a basket of attributes
  - Some attributes are inherent
    - Person – age, gender, race, weight, height, education, economic status
    - Case – time, location, specific risk or harm
  - Some attributes are assigned by the justice system
    - Person – complainant, victim, witness, suspect, convict, parolee
    - Case – civil matter/criminal matter, crime type, cleared by charge, prosecuted, dismissed, convicted, sentenced
- We speak of Crime Baskets as a convenient shorthand
Basket of Crimes is new concept

- **Crime Baskets can relate criminal acts but also link to:**
  - alcohol,
  - drugs,
  - cars,
  - residences,
  - interactions with people

- **Crime baskets can lead us to exploration of:**
  - Event complexity
  - Criminal careers
  - Social service careers
  - Criminal typologies
  - Justice system behavior
  - Social system behavior
Crime Baskets can be analyzed in many ways:

- Individual or Aggregate
- Case or Person
- Spatial or Temporal
- Functional or Procedural
Some Types of crime baskets

- **Police function**
  - Calls for service basket: principal and subsidiary attributes
  - Crime mix basket: principal and subsidiary attributes
  - Charge recommendation baskets (crimes that occur together)
- **Court level**
  - Charge baskets (crimes that are prosecuted as a group)
  - Conviction baskets (convictions that occur together as a group)
- **System handling**
  - Tracing charge baskets from police to prosecutor to conviction
  - Tracing process and procedure in case handling baskets
- **Offender baskets (sets of crimes in criminal events)**
  - Occasional Offenders (group crime type baskets)
  - Prolific Offenders
    - Individual crime baskets over time
Calls for service basket – RCMP E-Division

- Less than a third of CFS would be recorded in the standard crime rate
- Current debate on police resources mostly focuses on declining CRIME rate rather than CALLS FOR SERVICE rate

![Chart showing Total Calls for Service and Total UCR2 Violations for Surrey Detachment 2008-2012]

- Crime dropped 6%
- Calls for service increased 10%
Big Data

- Prior research based on small/ moderate samples
- Current research possible on Big Data
  - Size
  - Complexity
- Can explore variety of possible patterns of offending and justice system response
Basket of Crimes Analysis Using the ICURS Secure data facility

- ICURS secure lab
- PRIME BC RMS for RCMP E-Division
  - 182 of 193 police jurisdictions in British Columbia
  - ICURS holdings are de-identified but entity matched
- Data base records all calls for service & all police action
- Data base allows entry of up to four attributes for each CFS – these can be event (e.g., crime) type or police action type
  - Similar to NIBRS in this -- but comprehensive national coverage
- Data base contains much detailed information about the event.
- PRIME data base can be linked to COUR-BC
Overview of CasPR

- **CasPR is an ICURS developed analytic tool for working with the PRIME BC data base**
  - Originally developed to work with Ministry of Solicitor General Uniform Crime Reporting monthly returns

- **Provides tools for quickly identifying and analyzing trends in both the prevalence and quantum of:**
  - Calls for Service
  - Criminal Events
  - Clearance Rates

- **Ability to combine crime and other encounters with police involving**
  - Anti-Social Behavior
  - Nuisance
  - Drug, alcohol and mental health driven events

- **Can now do Crime Basket Analysis**
Background on how Crime Basket works in CasPR

- Examines all calls for service in BC and sorts through up to four event attributes
- Identifies highest types of calls and their associated baskets of attributes
- Identifies all entities (de-identified persons) involved in calls and their associated baskets of attributes
- Identifies highest repeat offenders by type of call
- Identifies entities who are high in multiple types of crimes
- Identifies procedural actions associated with crime types
<table>
<thead>
<tr>
<th>The Crime</th>
<th>InBasket</th>
<th>InBasket</th>
<th>Frequency</th>
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Relation Between Top 20 Crimes Co-occurred more than 3000

- Liquor - Intox in Public Place
  - Mischiefs $5000 or Under
  - 1430-0 - Assault - Common or Trespass
  - 3430-0 - Cause a Disturbance
    - 3309.0
    - 4991.0
- 3410-0 - Breach/Bail Violations
  - 2170-4 - Mischief $5000 or Under
    - 4991.0
  - 1430-0 - Assault - Common or Trespass
    - 3309.0
    - 8220.0
  - 7100-3 - Liquor - Intox in Public Place
    - 11445.0
- 1627-0 - Utter Threats Against Person
The Probability of Top 3 Events to Co-occur with Other Attributes in a Basket

- 8120-28: EXCESSIVE SPEED OVER 40KM
- 8130-2: COLLISION - NON-FATAL INJURY
- 8110-2: TRAFFIC OTHER NON-MOVE PROV
- 8110-Z01: ZZTRFFC-OTHER MOVING PROV
- 8110-90: VI-VEHICLE IMPOUNDMENT
- 8130-3: COLLISION DAMAGE OVER $1000
- 8110-1: TRAFFIC OTHER MOVING PROV
- 9230-Z30: ZZ2MPROD OP MOTOR VEH (ALCCH)
- 8190-8: SUSPICIOUS PERS/VEH/OCCUR
- 8190-1: UNSPECIFIED ASSISTANCE
- 8110-LEVEL: LEGITIMATE CALLS
- 8250-30: PRISONERS HELD
- 2170-4: MISCHIEF $5000 OR UNDER
- 2170-3: LIQUOR INTOX IN PUBLIC PLACE
- 8150-0: BREACH OF PEACE
- 3430-0: CAUSE A DISTURBANCE
- 1430-0: ASSAULT-COMMON OR TRESPASS
- 3520-0: BREACH OF PROBATION-ADULT
- 3410-0: BREACH/BAIL VIOLATIONS
- 8150-1: WARRANT - CRIM CODE

Tree diagram showing the probability of co-occurrence of various events.
Future of research

- Case history analysis
- Trajectory analysis
  - Offenders
  - Co-offenders
  - Crime sets
- Unstructured text analysis of description of events in relation to baskets
- Other roles of people besides offending:
  - Complainant
  - Victim
  - Witness
- Bunch of stuff we don’t yet know enough about crime baskets to realize we need to research as yet!
Thank you!