Offender mobility and distance decay:
Aggregated and offender level differences

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Research question

• Wim Bernasco (yesterday, Env.Crim.1):
  o “One of the most important laws – scientific laws – in criminology is distance decay.”

• Is it?
  o Is DD a universal law in (environmental) criminology?
  o Is offender mobility intertwined with different distance decay patterns?
    ▪ At the aggregate level
    ▪ At the level of the individual offender
Background: DD pattern

• Most crimes are committed close to home
• Gradual decline: the chance of criminal operations is reduced when the distance increases
• Prompted by rational choice and routine activities:
  o Travelling (for crime) takes time, costs and efforts and increases risk.
  o One will merely travel if profits outweigh costs (Morselli & Royer, 2008; Snook, 2004)
Debate

• Many studies have observed such a pattern
  o ...be it mostly on an aggregated level

• Van Koppen & De Keijer (1997) vs. Rengert, Piquero and Jones (1999):
  o DD is / is not the result of an ecological fallacy and cannot / can be found at both the aggregate and individual level

• Smith, Bond & Townsley (2009): two thirds of JTC variation resides between offenders.
  o It is worthwhile to bring decay analysis down to the level of the individual offender
Our research

• Divides distance decay into its two components:
  o Near home offending: average travelled distances are small
  o Decay: there is a gradual decline in crime as distances increase

• And aims at linking decay to offender mobility.
Method

• Property crimes with known offenders
• Nationwide (Belgium), but only geographic information on municipality level
• 5 ‘mobility’ features (for property crime):
  o Multiple offending (10 or more) ~ experience
  o Co-offending
  o Eastern European offenders
  o Older offenders (age 30 or more)
  o Offending of affluent target areas ~ ‘rich pickings’ (cfr. Mawby, 2001)
Results (aggregated)

• Higher mobility confirmed: mean travelled distances for these offenders were higher than for others

• Distance decay was observed for all groups, but deviated slightly for Eastern European offenders
Results (aggregated)

Aggregated distance decay patterns

- General
- Co-offenders
- Multiple offenders
- Eastern European offenders
- Offenders age 30+
- Attractive targets
Decay at the offender level

• Followed a method proposed by Smith et al. (2009):
  o Calculated skewness estimates and skewness z-scores for distances travelled by each individual offender
  o If right tail of distribution is longer than the left (= positive skewness) -> decay
  o Significant decay implies a skewness z score > 1.96 (2 standard deviations)

• Only for multiple offenders (to overrule the law of small numbers)
## Results (individual)

<table>
<thead>
<tr>
<th></th>
<th>$Sz &gt; 1.96$</th>
<th>$0 &lt; Sz &lt; 1.96$</th>
<th>$-1.96 &lt; Sz &lt; 0$</th>
<th>$Sz &lt; -1.96$</th>
</tr>
</thead>
<tbody>
<tr>
<td>All multiple offenders</td>
<td>49.4%</td>
<td>24.7%</td>
<td>14.1%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Co-offenders</td>
<td>48.5%</td>
<td>26.6%</td>
<td>15.1%</td>
<td>9.5%</td>
</tr>
<tr>
<td>Eastern European</td>
<td>38.5%</td>
<td>31.1%</td>
<td>19.7%</td>
<td>10.7%</td>
</tr>
<tr>
<td>Age 30+</td>
<td>45.8%</td>
<td>25.8%</td>
<td>18.1%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Attractive targets</td>
<td>46.0%</td>
<td>25.5%</td>
<td>16.2%</td>
<td>12.3%</td>
</tr>
</tbody>
</table>
Results (individual)

- For only half of the multiple offenders, a significant decay has been observed.
- For every 5 offenders with significant distance decay, there is 1 with significant distance increase.
- Sz is negatively correlated with mean distance ($r = -0.39$) -> DD is stronger for offenders who offend near home.
Conclusions

• Larger mobility may result in different DD patterns

• DD has been observed at the aggregate level...
  - Although basic group divisions already show certain changes (e.g. Eastern European offenders)

• ... but cannot be translated straightforward into DD at the level of the individual offender
  - Many offenders show no significant DD pattern ($Sz < 1.96$) or even follow a distance increase pattern ($Sz < -1.96$)
Was Wim Bernasco wrong?

• As far as I know, Wim is rarely just 'wrong'
• However, DD studies need to take into account particular issues:
  o e.g. previous residences
  o Other anchor points
• ... and is less universal on more detailed levels of analysis (different groups, individual offenders) than it is on a general level