Comparison between Repeats and Non Repeat Residential Burglaries: what is significantly different?

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Institute for Social Safety Studies
WHO ARE WE?

• Institute for Social Safety Studies
  – Department of Social Risks and Safety
    • Faculty of Management and Governance

• Education
  – Minor Crime Science
  – Public Safety Specialization of the Master of Science programme on Public Administration
DEFINITIONS

• **Repeat victimization**: crime incident that is experienced by the same target (i.e. individual, dwelling, business) within a specific period of time.

• **Types of repeats** (Lamm Weisel, 2005)
  - **Real repeats**: on same location
  - **Near repeats**: nearby or close-by
  - **Virtual repeats**: different location, same design
  - **Chronic repeats**: different crimes on same target

• **There are not only career criminals but also career victims.**
WHY REPEATS?

• Psychological impact
  – Research by Maguire (1980) and more recently by Beaton, Cook et al (2000) suggests it is not only psychologically distressing but may adversely affect the victim’s mental health.

• Cost-benefit
  – If offenders that commit repeat burglaries are the more prolific ones, catching these has more far reaching implications.
ARGUMENT

• A common lay explanation for repeat victimization is **bad luck**.

• A common view by police officers is that residential burglaries involve **no planning**.

• **We want to challenge these views!**
PREVIOUS RESEARCH

- Findings of various studies suggest that repeats and near repeats are the work of the same offender.
  - Spatial and temporal decay support this claim
  - Two explanations: flag or boost
    - Unusually attractive
    - Familiarity leads to feeling of low risk
RESEARCH QUESTION

• Are repeats significantly different to non-repeats from a temporal, modus operandi and a spatial viewpoint?

• Hypothesis: repeat residential burglaries are NOT a subset of residential burglaries.

• Method is hypothesis testing by comparing groups.
WHY RESIDENTIAL BURGLARY

• At national level, burglaries are on the decrease; however...

Decrease in burglaries in 2008:
• Burglaries by 31%
• Auto theft by 150%
• Theft from autos by 100%
• **Burglaries on the increase:** 10% more burglaries in Enschede in 2008 compared to the average of burglaries during 2004-2007.
DATA AVAILABLE

- 5 years (2004-2008) of police data
  - Usual (address, Start/End date/hour)
  - Type of house
  - Approach side
  - Entry object
  - Occupancy (retirement, student, unrestricted)
  - Stolen goods

- Vector map of roads and administrative boundaries (the latter I don’t use)

- Point maps with location of entertainment venues, supermarkets, schools, etc.
HOW TO MAKE COMPARISON

• Pease and Farrell highlight importance of distinguishing between 3 measures of crime:
  
  • Crime prevalence:
    ➢ victims per head
  
  • Crime concentration:
    ➢ crimes per victim
  
  • Crime incidence:
    ➢ crimes per head

1st case of repeat series
BOOST: SAME OFFENDER

3 month rolling repeats

28.2% of repeats within 3 month of previous event
TEMPORAL ANALYSIS

Burglaries: start and end time/date
End date is less than 1 day compared to Start time

Average: the method which uses the midpoint between the earliest and the latest date of the event
Aoristic: a weighted method which assigning probabilities to the range between the earliest and latest dates
The graph shows the percentage of non-repeats, 3-month repeats, and expected repeats across different months. The p-value is 0.03, indicating statistical significance.
# HOUSE TYPE

<table>
<thead>
<tr>
<th></th>
<th>Non Repeats</th>
<th></th>
<th>Repeats</th>
<th></th>
<th>Repeats 1st Case Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
<td>Count</td>
</tr>
<tr>
<td>Apartment</td>
<td>409</td>
<td>15.22</td>
<td>73</td>
<td>14.37</td>
<td>33</td>
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<tr>
<td>End House</td>
<td>949</td>
<td>35.31</td>
<td>197</td>
<td>38.38</td>
<td>97</td>
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<td>Terraced</td>
<td>782</td>
<td>29.09</td>
<td>131</td>
<td>27.44</td>
<td>62</td>
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<tr>
<td>Semi-det.</td>
<td>145</td>
<td>5.39</td>
<td>19</td>
<td>3.61</td>
<td>8</td>
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<tr>
<td>Detached</td>
<td>403</td>
<td>14.99</td>
<td>88</td>
<td>19.49</td>
<td>36</td>
</tr>
<tr>
<td>n</td>
<td>2688</td>
<td>508</td>
<td>236</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- $\chi^2 = 8.287$, $p = 0.0816^*$, marginally significant
- $\chi^2 = 4.886$, $p = 0.2991$, not significant

df=4 (two-tailed)
## OCCUPANCY

<table>
<thead>
<tr>
<th></th>
<th>Non Repeats</th>
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<th>Repeats 1&lt;sup&gt;st&lt;/sup&gt; Case Only</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Count %</td>
<td>Count %</td>
<td>Count</td>
<td>%</td>
<td>Count %</td>
</tr>
<tr>
<td>Retirement</td>
<td>131 4.48</td>
<td>11 1.99</td>
<td>6</td>
<td>2.37</td>
<td></td>
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<tr>
<td>Student</td>
<td>80 2.74</td>
<td>34 6.15</td>
<td>11</td>
<td>4.35</td>
<td></td>
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<tr>
<td>Mixed</td>
<td>2711 92.78</td>
<td>508 91.86</td>
<td>236</td>
<td>93.28</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>2922</td>
<td>553</td>
<td>253</td>
<td></td>
<td></td>
</tr>
<tr>
<td>df=2 (two-tailed)</td>
<td></td>
<td>x2= 31.153</td>
<td>x2=4.904</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>p=0.0001****</td>
<td>p=0.0861*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>extremely significant</td>
<td><strong>marginally significant</strong></td>
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# STOLEN GOODS

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<tr>
<th>Item</th>
<th>Non Repeats</th>
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<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
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<tr>
<td>Electronics</td>
<td>1092</td>
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<td>32,87</td>
<td>36</td>
<td>42,86</td>
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<td>Money</td>
<td>529</td>
<td>17,70</td>
<td>67</td>
<td>18,66</td>
<td>12</td>
<td>14,29</td>
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<td>223</td>
<td>7,46</td>
<td>17</td>
<td>4,74</td>
<td>3</td>
<td>3,57</td>
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<tr>
<td>Bags</td>
<td>202</td>
<td>6,76</td>
<td>25</td>
<td>6,96</td>
<td>5</td>
<td>5,95</td>
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<td>Jewelry</td>
<td>477</td>
<td>15,96</td>
<td>73</td>
<td>20,33</td>
<td>12</td>
<td>14,29</td>
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<tr>
<td>Others</td>
<td>465</td>
<td>15,56</td>
<td>50</td>
<td>16,43</td>
<td>16</td>
<td>19,05</td>
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<tr>
<td>n</td>
<td>2988</td>
<td></td>
<td>359</td>
<td></td>
<td>84</td>
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</tbody>
</table>

\[
\chi^2 = 10.061 \\
p = 0.0735^* \\
\text{marginally significant}
\]

\[
\chi^2 = 4.055 \\
p = 0.5415 \\
\text{not significant}
\]

df = 5 (two-tailed)
## APPROACH SIDE

<table>
<thead>
<tr>
<th></th>
<th>Non Repeats</th>
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<th>Repeats</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>Back</td>
<td>1534</td>
<td>59.97</td>
<td>294</td>
<td>64.33</td>
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<tr>
<td>Front</td>
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<td>33.07</td>
<td>122</td>
<td>26.70</td>
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<tr>
<td>Side</td>
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<td>5.36</td>
<td>32</td>
<td>7.00</td>
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<tr>
<td>Others</td>
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<td>1.60</td>
<td>9</td>
<td>1.97</td>
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<tr>
<td>n</td>
<td>2558</td>
<td></td>
<td>457</td>
<td></td>
</tr>
</tbody>
</table>

\[ \chi^2 = 9.754 \quad p = 0.0208** \]

\textit{significant}

\( \text{df} = 3 \) (two-tailed)
## ENTRY OBJECT

<table>
<thead>
<tr>
<th></th>
<th>Non Repeats</th>
<th></th>
<th>Repeats</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Door</td>
<td>1664</td>
<td>58.24</td>
<td>273</td>
<td>53.22</td>
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<td>Window</td>
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<tr>
<td>Others</td>
<td>182</td>
<td>6.37</td>
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<td>6.63</td>
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<tr>
<td>n</td>
<td>2857</td>
<td></td>
<td>513</td>
<td></td>
</tr>
</tbody>
</table>

`df= 2 (two tailed)`

x2=5.569
p=0.0618* 
marginally significant
SPATIAL ANALYSIS

• Geocoding of addresses

Unique Address:
Emmastraat 95, a
Emmastraat 96, 14

Residential Burglaries
Enschede 2004-2008
SPATIAL ANALYSIS

- Are the repeats a spatial subset of all burglaries?
DOUBLE DENSITY KERNEL

All Burglaries

Repeat Burglary Risk

Variable repeat risk

Very high
High
Medium
Low
Very low
CRIME PATTERN THEORY

- Awareness space
- Proximity to major traffic arteries

source: T. Adeane
POINT MAPS

Non Repeats
n=3055

Repeats
n=564

Do repeats follow the same spatial trend as non repeats?

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SUPERMARKETS

All Repeats are closer

1st Case Repeats are closer

p=0.0023***

p=0.054*
p=0.0024*** AllRepeats are closer
p=0.027** 1stCaseRepeats are closer

UNIVERSITEIT TWENTE.
p=0.0016** AllRepeats are closer
p=0.09* 1stCaseRepeats are closer
$p = 0.0001^{****}$  AllRepeats are closer

$p = 0.003^{***}$  1stCaseRepeats are closer

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"COFFEE SHOPS"

$p > 0.0001 ****$ AllRepeats are closer
$p = 0.03 **$ 1stCaseRepeats are closer
IMPLICATIONS FOR CRIME PREVENTION

• A geographical regression model would allow to assess:
  
  – the effects of a new road, school or commercial establishment on nearby (existing) development

  – the crime risk levels for new housing development scenarios.
FINAL REMARKS

• Are repeats a subset of burglaries?
  – Temporal viewpoint: YES
  – Spatial viewpoint: NO

• 5 year restriction on data

• Not all records are complete
  • Details about stolen items is missing from a large number of cases.
  • Start and End date and hour unreliable

• Aim to refine the distance to road by working out the network distances

• Testing plot size shortly

• House prices

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THANK YOU!