Comparison of severity assessments based on Czech and Swedish traffic conflict techniques

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Introduction

Accidents
Conflicts

Accidents
Serious conflicts
Slight conflicts
Potential conflicts

Fatal
Severe injury
Slight injury
Damage only

Undisturbed passages

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Introduction

**Traffic conflict** = an observable situation in which two or more road users approach each other in space and time to such an extent that a collision is imminent if their movements remain unchanged *(Amundsen & Hydén, 1977)*
Introduction

Validity

Reliability
Introduction

Various TCTs exist...

... but hardly ever cross-compared

*Malmö study, 1983*
Introduction

- Conflict = type + severity
- Severity assessed **objectively** or **subjectively**
- Evasive manoeuvre
Introduction

- **Subjective** (US, French, German ...and Czech)
- **Objective** (Swedish...?)

- *Are these two comparable?*
Data

- > 150 short videos from CZ

- Two groups chosen:
  - 69 turning/merging vehicle-vehicle interactions
  - 23 pedestrian-vehicle interactions
<table>
<thead>
<tr>
<th>severity grade</th>
<th>description</th>
<th>severity</th>
<th>physical reactions</th>
<th>events related to vehicles</th>
<th>events related to pedestrians</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>(mis)behaviour</td>
<td>none</td>
<td>no reactions</td>
<td>breaking the rules without consequences, misbehaviour of road users</td>
<td>breaking the rules, e.g. crossing outside of zebra</td>
</tr>
<tr>
<td>1</td>
<td>conflict</td>
<td>slight</td>
<td>low</td>
<td>fluent, controlled, predictable manoeuvres</td>
<td>change of walking direction</td>
</tr>
<tr>
<td>2</td>
<td>medium</td>
<td>medium</td>
<td>obstruction</td>
<td>pronounced, sudden, unpredictable manoeuvres</td>
<td>change of walking speed, sudden entering the zebra</td>
</tr>
<tr>
<td>3</td>
<td>severe</td>
<td>severe</td>
<td>endangerment</td>
<td>critical, emergency manoeuvres</td>
<td>shocking manoeuvres</td>
</tr>
<tr>
<td>4</td>
<td>accident</td>
<td>various levels</td>
<td>(property damage only or injury accidents)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Swedish TCT

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Comparison

- Interaction severity assessed by both methods
- Three conflict grades:
  - 0 (none)
  - 1 (slight)
  - 2 (severe)
- Comparison of (dis)agreement
Comparison

Turning/merging:

<table>
<thead>
<tr>
<th></th>
<th>SW 0</th>
<th>SW 1</th>
<th>SW 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CZ 0</td>
<td>13</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CZ 1</td>
<td>14</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>CZ 2</td>
<td>3</td>
<td>13</td>
<td>6</td>
</tr>
</tbody>
</table>

Agreement with SW

<table>
<thead>
<tr>
<th>Level</th>
<th>SW Count</th>
<th>CZ Count</th>
<th>Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>13 / 30</td>
<td></td>
<td>43%</td>
</tr>
<tr>
<td>slight</td>
<td>20 / 33</td>
<td></td>
<td>61%</td>
</tr>
<tr>
<td>severe</td>
<td>6 / 6</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>total</td>
<td>39 / 69</td>
<td></td>
<td>57%</td>
</tr>
</tbody>
</table>
Comparison

Pedestrians:

<table>
<thead>
<tr>
<th>Agreement with SW</th>
<th>none</th>
<th>slight</th>
<th>severe</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 / 12</td>
<td>1 / 3</td>
<td>8 / 8</td>
<td>15 / 23</td>
</tr>
<tr>
<td></td>
<td>50%</td>
<td>33%</td>
<td>100%</td>
<td>65%</td>
</tr>
</tbody>
</table>

![Table and graph showing comparison of SW, CZ, and TCT values]
Comparison

- Agreement with SW approx. 60%
- Agreement increases with severity to 100%

- CZ detects more than SW
- Differences mainly with:
  - interactions at low speed
  - no collision course
  - (un)controlled interactions
Discussion

Pros/cons of both methods?

CZ:

- subjective
- severity estimates may not be reliable
- short observation period
- validity?
Discussion

SW:

- objective
- accuracy of measurements?
- longer observation period
- validated
Discussion

- Variations in detection rather than in the evaluation of severity (Grayson, 1984)
- Serious conflicts classified subjectively by observers correlated better with accidents (Svensson, 1992)
- Type of road users really matters (Shbeeb, 2000)
- Different safety expectations $\rightarrow$ different severity ratings (Shbeeb, 2000)

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Discussion

- Automated conflict studies
- New method, new conflict definition – new validation
- Advantage – more standardised approach
References


Thank you for your attention!

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