Behavioral adaptation of older drivers in response to Advanced Driver Assistance Systems (ADAS)

Mandy Dotzauer & Wiebo Brouwer

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<th>Results</th>
<th>Conclusion</th>
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<tr>
<td><strong>Question:</strong></td>
<td>• Could ADAS support older drivers and mildly impaired older drivers in decision making on intersections?</td>
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<td><strong>Problem:</strong></td>
<td>• Will ADAS use lead to negative behavioral adaptation?</td>
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# ADAS and Scenario

## Intersection Assistance:
- Based on the notion of car-to-car communication
- Information conveyed through Head up display (HUD):

![Timeline Diagram]

## Scenario:
- Assessing the effectiveness of implemented system
- Intersections:
  - Speed limit 30 km/h
  - Yield to the right
  - Bushes placed at the intersection obstruct view
  - Cars could approach the intersection from either side

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**Current Study**

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## Method

### Participants:

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<tr>
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<th>Control Group</th>
<th>Healthy Drivers</th>
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<tbody>
<tr>
<td><strong>N</strong></td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td><strong>Mean Age</strong></td>
<td>70.44 ± 6.24</td>
<td>72.44 ± 2.87</td>
</tr>
<tr>
<td><strong>MMSE</strong></td>
<td>29 ± 1</td>
<td>29.56 ± 0.52</td>
</tr>
<tr>
<td><strong>TMT/A</strong></td>
<td>45.89 ± 12.27</td>
<td>42.78 ± 12.25</td>
</tr>
<tr>
<td><strong>TMT/B</strong></td>
<td>98.22 ± 26.25</td>
<td>83.67 ± 15.70</td>
</tr>
<tr>
<td><strong>Ratio: TMT</strong></td>
<td>2.20 ± 0.58</td>
<td>2.06 ± 0.59</td>
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### Study Design:

- Driving simulator study
- Mixed study design with repeated measures
- Control group (CD): no ADAS
- Treatment groups (HD): with ADAS, except on Trial 1, 7, and 13 or 14

### Dependent Measures:

- Intersection time
- Gaze behavior
- Maximum speed

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Method

Procedure:

Phase 1
- Screening and Simulator Training
  - week 1

Phase 2
- Experimental Trials (12 trials)
  - week 2
  - week 5

Phase 3
- Retention Interval (4 weeks)
  - week 6
  - week 9

- Final Assessment
  - week 10

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Statistical Analysis

Data:
- Out of 14 trials, 4 depicted for further analysis

Between-subject comparison:
- Mann-Whitney U test

Within-subject comparison:
- Friedman’s ANOVA
  - Wilcoxon test
Results

Intersection Time

![Graph showing intersection time for different trials]

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Results

Maximum Speed

Current Study

Method

Results

Conclusion

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Conclusion

Intersection Time:
- Effect of ADAS on HD: over time, learn to cross intersections faster

Gaze Behavior:
- No change in gaze behavior in CD over time
- ADAS effects gaze behavior of HD
  - When riding with ADAS, HD spent more time looking at the center
- Difference in Trial 7: HD looks less to the left and right compared to the baseline trial

Maximum Speed:
- ADAS seems to effect choice of maximum speed

➤ Analysis of safety indicator

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Thank you for your attention!

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