MobilTrain: Preservation and enhancement of skills to facilitate the individual mobility of elderlies

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The project MobilTrain

Mobility Analysis

Mobility Training

Evaluation
Mobility analysis

Focus groups from urban vs. rural regions:
• How do elderlies from different regions differ in their need for mobility?
• Which trips are done with which modes of mobility for which purposes?

Driving test in real traffic:
• Which driving errors are typical for elderly drivers as assessed by driving tests in real traffic?
Favored means of transportation

Urban area

- Motorised driving
- Local traffic
- By foot
- Bike
- Taxi
- Ride sharing
- Riding
- Plane
- Ship

Portion of participants [%]

Aims

- Shopping
- Leisure
- Holiday
- Family/peers
- Job/honorary office
- Doctor/civil services
- Church
Motorized driving for all investigated elderlies very important, but in rural region indispensable.
On-road driving tests

- Standardized test route through the urban area of Würzburg, on rural roads and on autobahn with a driving instructor and a traffic psychologist
- Assessment of fitness to drive by a traffic psychologist, the driving instructor and by the elderly drivers themselves
S.A.F.E. for on-road evaluation

- Test route is subdivided in 28 driving situations
- GPS location of the actual driving situation
- Semiautomatical registration and classification of driving errors
- Assessment of driving performance by the Fitness to Drive Scale
Assessment of driving performance with the Fitness to Drive Scale

- No significant relationship between rating of driving instructor and self-ratings
- Ratings of driving instructor and of traffic psychologist are highly correlated ($r=0.820$)
- Many elderly drivers overestimate their driving performance
Observed driving errors

- Rather to fast than to slow
- Inadequate securing behavior
- “Blinking economists”
Consequences for training

- **Training of correct securing behavior**
  - on autobahn during lane change
  - in urban scenarios during turning at intersections

- **Merging and lane changing on highways**

- **Imparting compensation strategies**
  - Driving slower
  - With wider distances
  - With less hustle
Driving simulator based training

Four sessions that last about two hours each:

1) Familiarization session
2) Refreshing knowledge on rules of priority
3) Merging/Lane changes/Driving on highways
4) Passing through complex intersections in urban areas
TP1: Rules of priority

• Practicing the correct securing behavior during turning at intersections with varying rules of priority

5 situations

X 4 priority of way rules ▽, ▼, ◯/△, STOP

• Eye tracking to check securing behavior
TP2: Merging/Highway Driving

• **Entering/ Leaving highways:**
  – Practicing merging with varying traffic densities and acceleration lanes of varying length
  – Visualization of inadequate acceleration by means of enhanced reality elements

• **Car Following and Lane Changes**
  – Practicing lane changes with appropriate time headways
  – Dealing with entering maneuvers of other vehicles
  – Visualization of critical time headways by means of enhanced reality element
TP3: Complex intersections

- Intersections are based on police recorded hazard black spots (Poschadel, 2012)
- Three stages of difficulty being adaptively presented
- Rating of each situation by means of the tablet application S.A.F.E.
Replay videos for feedback
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<th>Middle-aged controls N=10</th>
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Conclusions

- Particularly for elderlies in rural regions, car driving is very important for their individual mobility.
- On road driving tests revealed that most elderlies could benefit from additional training.
- Recent technical developments in the field of driving simulation are used to support the training of elderlies:
  - Enhanced reality elements
  - Video based feedback
  - Adaptative scenario presentation while driving
Thank you for your attention!

...for traffic safety!
Assessment of driving performance with school grades

- According to the driving instructor rating, 6 of 19 senior drivers failed the driving test.
- There was no relationship between self-ratings and ratings of the driving instructor ($r = .063$).
- Ratings of the traffic psychologist and of the driving instructor were moderately correlated ($r = .644$).