

MOTION SICKNESS IN CARS: INFLUENCING HUMAN FACTORS AS AN OUTLOOK TOWARDS HIGHLY AUTOMATED DRIVING

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Motivation

The individual susceptibility for motion sickness in cars varies broadly. Human factors which influence motion sickness have to be understood to improve comfort for highly automated driving scenarios.

The Motion Sickness Susceptibility Questionnaire Short-form (MSSQ-Short) has shown to present a good self-evaluation. Additionally age, gender and personality traits have been discussed and their connection to motion sickness is still a research topic.

To analyse those items and answer the question on how individuals experience motion sickness by discrete symptoms an online survey was applied.

It was the goal to achieve items of pre-categorisation and common coping strategies for further testing and development of countermeasures.

Method

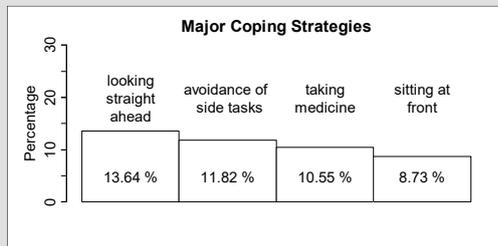
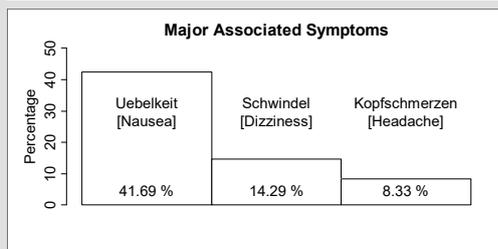
The online survey had the following content: experience with motion sickness in cars and in general (MSSQ-Short by Golding, 2006), associated situations (free text), activities in cars (free text), coping strategies (free text), personality traits (BFI-10 by Rammstedt & John, 2007), demographic facts.

408 Participants completed the survey ($M_{age} = 35.24$; $SD = 12.67$).

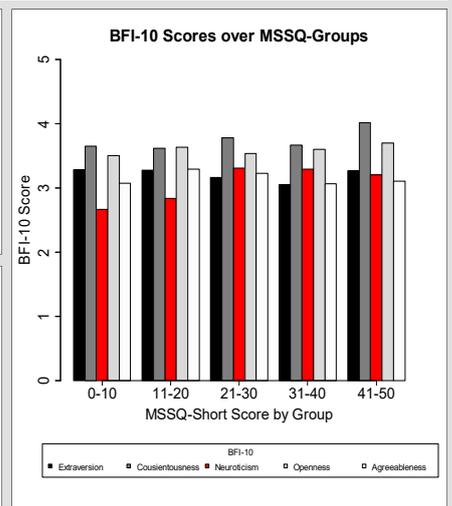
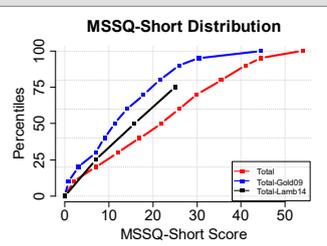
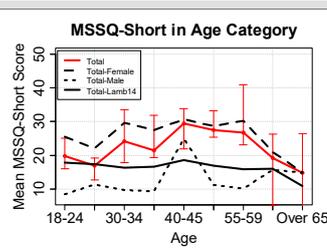
The respondents had a strong bias towards female gender ($n_{male} = 121$ (29.66%); $n_{female} = 287$ (70.34%)).

Results

SYMPTOMS + COPING STRATEGIES



MOTION SICKNESS SUSCEPTIBILITY + PERSONALITY



Conclusion

- **Three terms confirmed known symptoms** and their order of importance
- The occurring symptoms for cars were identical to other motion environments (e.g. ships, simulators) (Neukum et al., 2006)
- Possible use cases during highly automated driving were in contradiction to coping strategies
- The solution of **taking medicine is highly critical** for scenarios when a person's role changes between passenger and driver
- **It is confirmed that women report higher MSSQ-short score than men ($p < .001$)**
- The large difference in the sample between genders in the response to the survey indicates this influence
- **A positive coefficient between Age and MSSQ-short score ($p = .033$) was found**
- Compared to the susceptibility in general public with low self selection effects stated by Lamb et al. (2014) a **large increase of MSSQ-short score is found** in ages between 35 and 59
- A comparison to Golding (2006) and Lamb et al. (2014) showed that a higher group of susceptibility dominates this data

- **Neuroticism correlated positive to MSSQ-short score ($p < .01$)**
- This supports the findings by Wilding et al. (1972), where as Nieto et al. (2006) did not find an effect with a more general public like group (lower Mean MSSQ-short score)
- **Neuroticism again correlated to MSSQ-short score for an over average susceptibility group**

Outlook

- **For testing with German speaking subjects symptom rating can be done with "Uebelkeit, Schwindel, Kopfschmerzen"**
- **Coping strategies seem to contradict the advantage of highly automated cars which increases the importance of countermeasure research**
- **MSSQ-short score, age and gender will be used for the selection of more critical subjects for validation of symptom occurrence in real car driving tests**

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