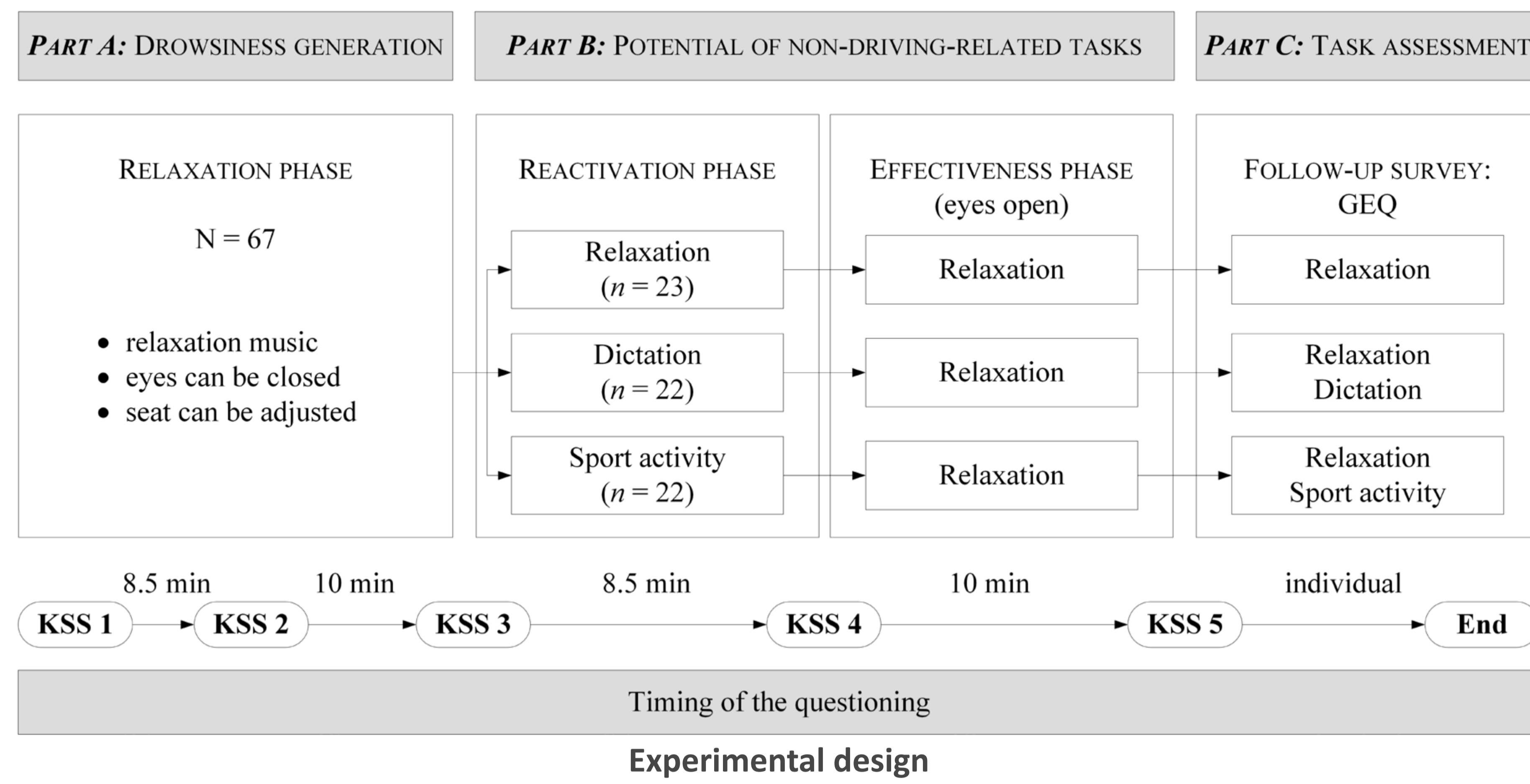


Automated Driving and Driver Drowsiness

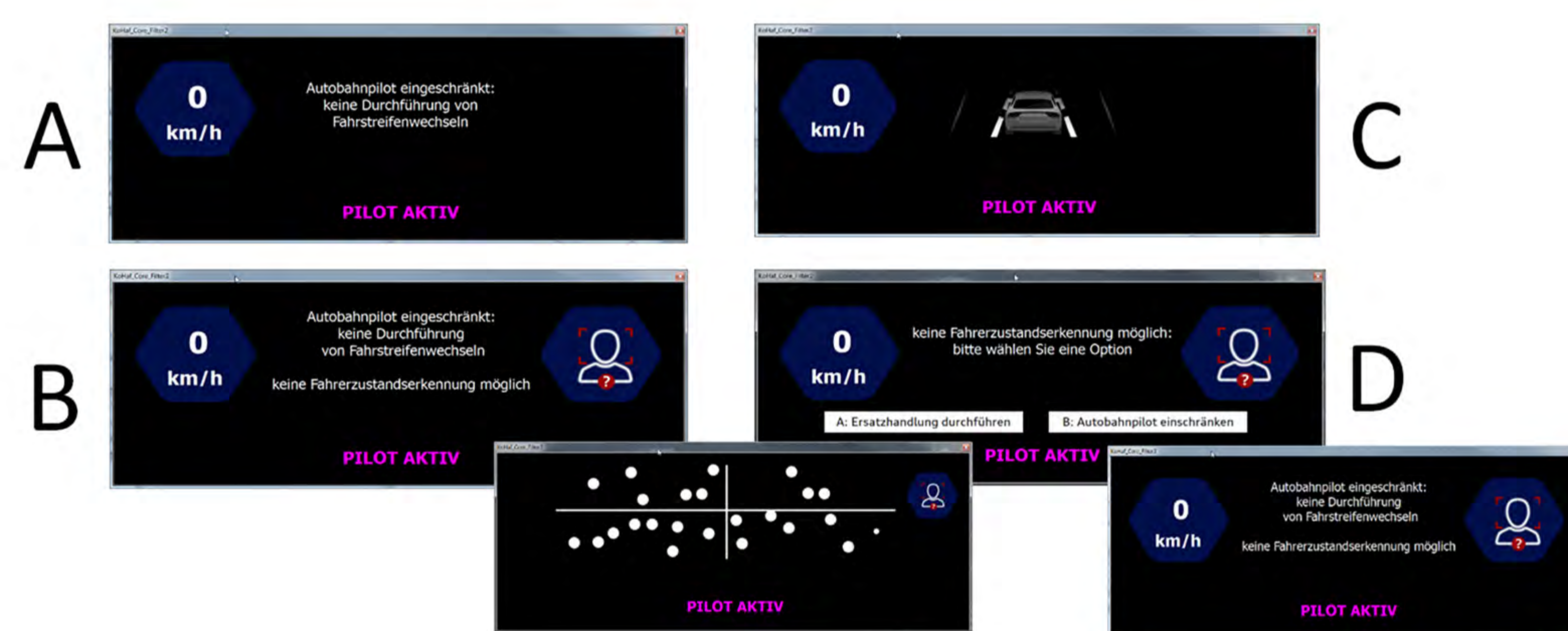
AUTOMATED DRIVING: THE POTENTIAL OF NON-DRIVING-RELATED TASKS TO MANAGE DRIVER DROWSINESS³



“This study proved the reactivation potential of non-driving-related tasks. This became clear, as no participant of the Dictation and Sport activity group exceeded KSS level 7 at the end of the reactivation phase. In addition, after the subsequent effectiveness phase the number of participants exceeding a KSS level of 7 was considerably smaller (with 10.52 percent when participants did the Dictation and 15.00 percent when participants did the Sport activity task before the Relaxation task) compared to the group who had to relax during the entire study (38.89 percent).“ (Weinbeer et al., submitted)

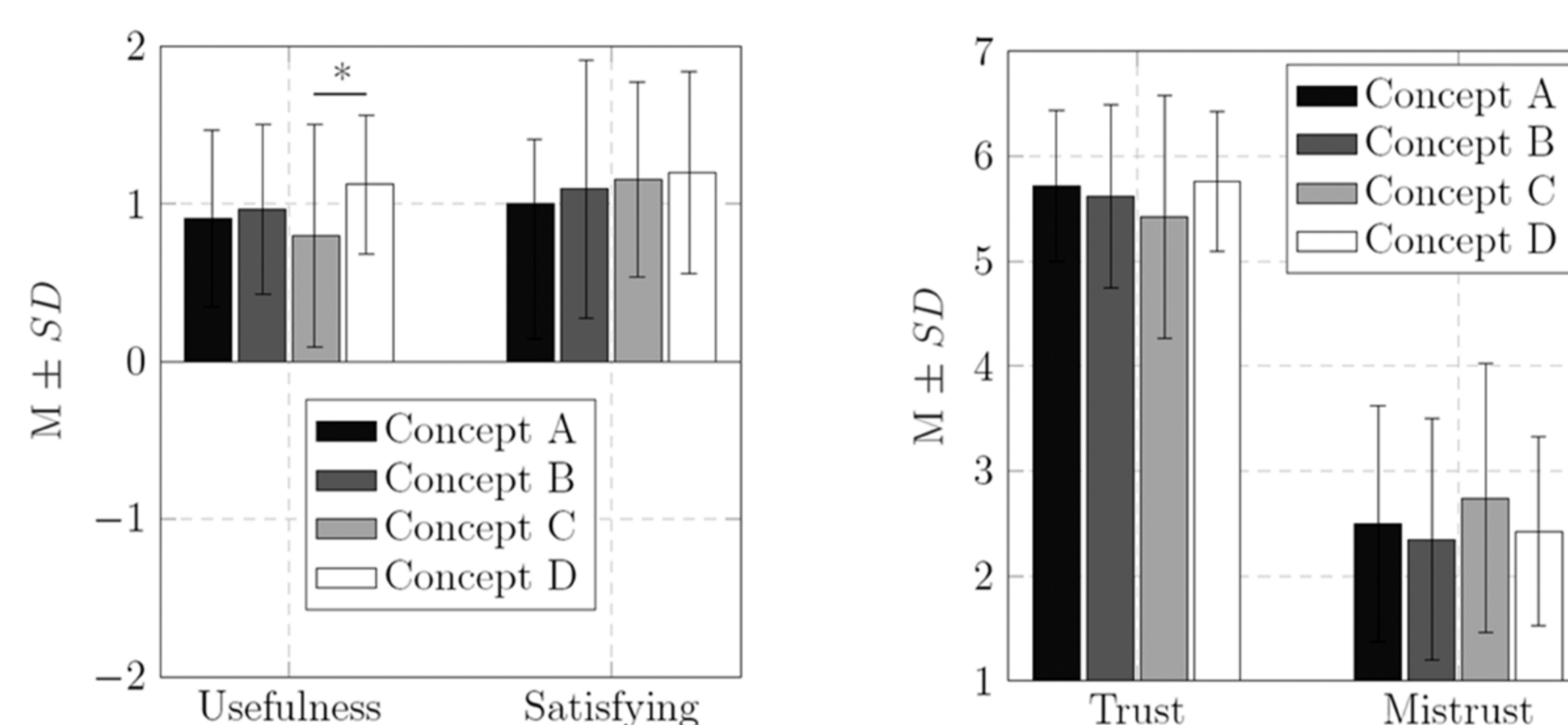
$$\text{Karolinska Sleepiness Scale}_{\text{rating}} = \begin{cases} x \leq 7 & \text{drowsiness is not considered a system limit} \\ x > 7 & \text{drowsiness is considered a system limit} \end{cases}$$

HOW TO DEAL WITH UNCERTAINTY PERIODS OF A DRIVER-MONITORING-SYSTEM? – EVALUATION OF DIFFERENT CONCEPTS



Results

- There was a significant difference between the usefulness of Concept C compared to Concept D. Concept D (feedback and offer of a compensation task) was rated best.
- When Concept D was presented, 66 percent of the participants decided to conduct the compensation task. Hence, feedback about a DMS uncertainty and a compensation task should be provided before an ADS adaption is performed.
- There was no statistically significant difference between the different concepts, regarding automation trust, mistrust, and satisfying.



References:

Johns, M. (1998) 'Rethinking the assessment of sleepiness', Sleep Medicine Reviews, Vol. 2, No. 1, pp.3–15.

¹Weinbeer, Bill, Baur, and Bengler (2018). Automated driving: subjective assessment of different strategies to manage drowsiness. De Waard, D., Di Nocera, F., Coelho, D., Edworthy, J., Brookhuis, K., Ferlazzo, F., ... Toffetti, A. (2018). Varieties of interaction: from User Experience to Neuroergonomics: On the occasion of the Human Factors and Ergonomics Society Europe Chapter Annual Meeting in Rome, Italy 2017. HFES.

²Weinbeer, Baur, Radlmayr, Bill, Muhr, and Bengler (2017). Highly automated driving: How to get the driver drowsy and how does drowsiness influence various take-over aspects? 8.Tagung Fahrerassistenz, München.

³Weinbeer, Muhr, and Bengler (submitted). Automated driving: The potential of non-driving-related tasks to manage driver drowsiness.

