



HUMAN-MACHINE-  
INTERACTION

# Optimizing the human-machine interface for take-overs

## EXPERIMENT 1 – PERIPHERAL MONITORING

**Summary:** Peripheral monitoring of traffic during engagement into a visual non-driving related task in the head-up display does not result in better take-over performance

**More details:** Radlmayr, Brüch, Schmidt, Solbeck, & Wehner. (2018). *Peripheral Monitoring of Traffic in Conditionally Automated Driving*. To be presented at the *Human Factors and Ergonomics Society Annual Meeting* in October 1–5, 2018, Philadelphia, USA

## EXPERIMENT 2 – CONCEPTION AND EVALUATION OF SUPPORTIVE INFORMATION IN THE HEAD-UP DISPLAY FOR TAKE-OVER SITUATIONS

- Does **additional information** in the **head-up display** (HUD) during the take-over increase the subjective and objective take-over performance?

### METHOD

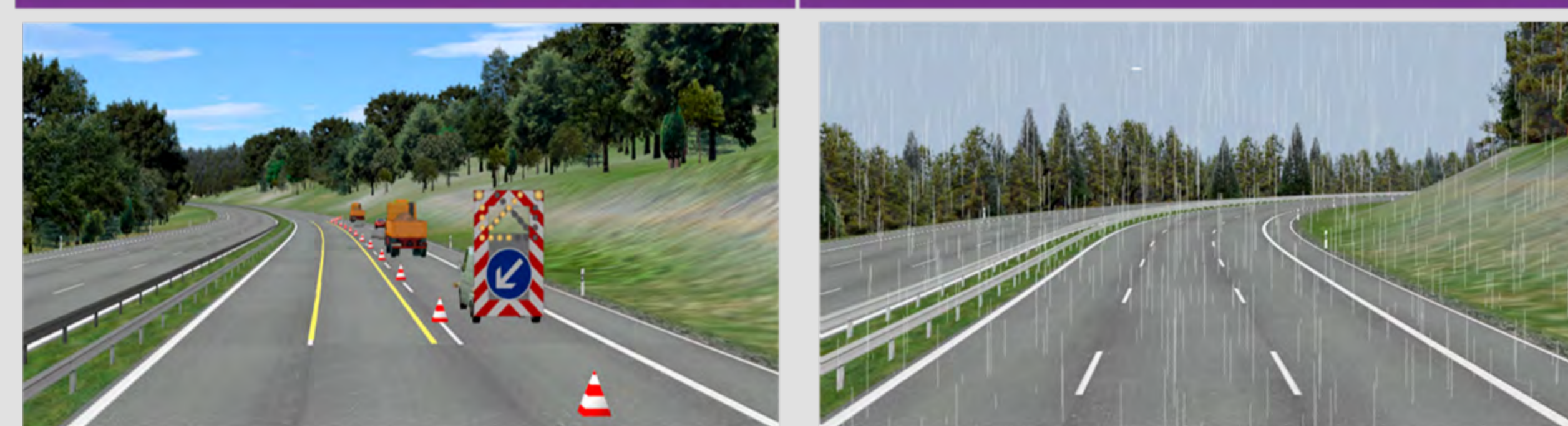
- Driving simulator (static) study
- n = 40, mean = 31 years (SD = 13y)

**NDRT:** Surrogate reference task, SuRT (for all participants)

#### Experimental design

Within subject factor: situation / obviousness of reason for take-over

Construction site	Curve in heavy rain
Obvious reason	Imperceptible reason



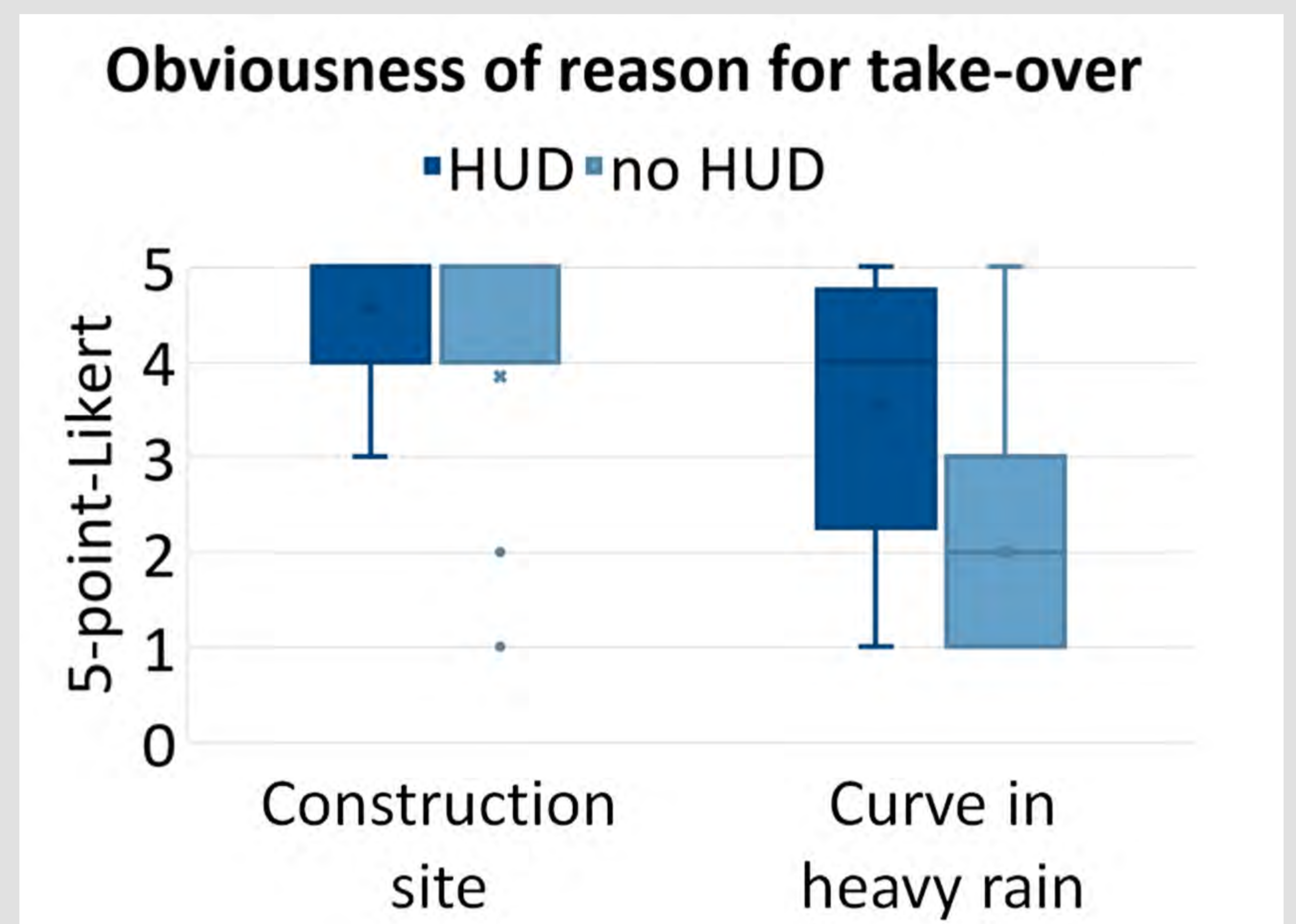
Between subject factor: HMI



#### Measures

- Eye tracking (percentage eyes on road, PEOR)
- Time and quality aspects of take-over performance (take-over time, accelerations, time-to-collision)
- Subjective parameters (criticality, obviousness of reason for take-over, usefulness, satisfaction)

### RESULTS



#### Vehicle dynamics

No significant differences between the situations and the groups with/out head-up display

#### Eye-Tracking

The group with additional information in the HUD shows a significantly higher PEOR

#### Subjective Rating

HUD group: **significant better rating** for

- Obviousness of reason for RtI
- Usefulness and satisfaction
- Perceived safety and efficiency of the HMI
- Desire to buy and use

## SUMMARY

Additional information in the head-up display during a take-over improves the subjective rating by drivers