

## Minimum required attention

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Many definitions of driver inattention and distraction have been proposed over the years, but they are difficult to operationalise, and inconsistencies between and within definitions are commonplace (Foley et al. 2013). Instead of focussing on distraction, we believe that a more accessible way forward is to start with defining what it means to be an attentive driver.

Here we propose a human-centred driver attention framework, the minimum required attention theory (MRA). MRA describes which role the attention of the driver plays in the situation awareness of the traffic system (see Salmon et al. 2012 for a review on situational awareness). A driver is considered attentive when he or she samples sufficient information to meet the demands of the system, i.e. that the driver should be able to form and maintain a good enough mental representation of the relevant part of the situation at hand. A driver should only be considered inattentive when this mental representation is not maintained well enough, regardless of whether the driver is concurrently executing an additional task or not.

Four stages are involved in the operationalisation of MRA: defining prototypical situations, determining the information carrying agents/targets in each prototypical situation, setting up the minimum requirements on information sampling for each target/agent, and measuring when and how a driver samples information from each target/agent. Stages 1 – 3 set up the MRA requirements, whereas Stage 4 can be seen as the application phase, where it is checked whether a driver violates the requirements and should be considered distracted. During the presentation, we will exemplify the four stages and demonstrate how the minimum requirements are set up for a number of prototypical situations related to motorway driving.

The MRA theory is anchored in well-established theories of driver attention, which postulate that drivers actively adapt to situational demands and allocate their resources based on external requirements and internal motivations. MRA has the potential to provide the stepping stone for unbiased and operationalisable inattention detection and classification and should be seen as a theoretical starting point for the eventual goal of developing an operational inattention detection algorithm.

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Foley, J. P., Young, R. A., Angell, L., & Domesy, J. E. (2013). Towards operationalizing driver distraction. Paper presented at the Proceedings of the 7th International Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design.

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