

## **Movement intention determines the sensory information on which the movement is based; a plea for action-related traffic safety research**

Eric Maris, Donders Institute for Brain, Cognition, and Behaviour

Moving safely through traffic strongly depends on our ability to separate relevant from irrelevant sensory input. This is why voluntary (top-down, endogenous) attention is one of the core cognitive functions studied in relation to traffic safety. Specifically, our ability to use predictive cues in our environment is essential for our ability to anticipate on possible dangers. However, road users are not passive observers of the traffic around them; they are actively moving through this traffic. Movements always involve some intention to move (turning/stopping/accelerating at a particular point/time), and this intention may very well affect the way sensory evidence is integrated in the movement plan (turn left or right, stopping or accelerating, ...). Surprisingly, the dominant theory of sensory evidence integration (Gold & Shadlen, 2007) does not take movement intentions into account, and assumes that sensory evidence integration is optimal in the following sense: all relevant sensory information is integrated in the movement plan. In this talk, I will show the results of an experiment that demonstrates that sensory evidence integration is highly non-optimal. Specifically, I will demonstrate that the movement plan is dominated by the sensory information in a rather short time window centered at 450 ms before movement onset. I will discuss the consequences of these findings for research on traffic safety.