

## **HFES-Europe Chapter Annual Meeting 2014**

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### **Title:**

Construction of drivers' spatial representations of traffic elements at signalised intersections in urban areas

### **Abstract:**

During left- and right-turns with oncoming traffic at urban intersections, a correct mental representation of the spatial positions of surrounding traffic elements (e.g. cars, cyclists, and pedestrians) is needed. If the traffic elements are not represented correctly in drivers' mental models, the probability of an accident occurring increases. An inadequate allocation of cognitive resources while approaching intersections may result in an impaired mental representation of the spatial positions of other traffic elements. In turn, impaired mental representations may lead to inadequate driving decisions. A dual-task experiment was conducted in order to investigate the impact of the allocation of cognitive resources on the construction of spatial representations at intersections. While approaching a signalised intersection, participants had to: (i) construct a spatial representation of the surrounding traffic elements and (ii) react to a spatially demanding secondary task. While solving the secondary tasks drivers shifted cognitive resources away from the first task. The response times and the quality of the responses were recorded. The results show, that the construction of spatial representations is a function of the allocation of cognitive resources and the distance-to-stop-line. The results presented form the basis for a cognitive driver model, supporting the development of Intersection-Assistance systems.