

# Drowsiness warning and driver acceptance –a simulator experiment

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## Abstract

Driver's opinion on, and response to, a drowsiness warning system was studied in a driving simulator. Within-subject factor in the experiment was 'Vigilance' and had the values (conditions) 'fatigued' (directly after a night-shift) and 'vigilant'. The dependent variables were self-report measures and vehicle measures. Results show that in general workload and state assessment scales confirmed the participants' supposed state during each of the two conditions. Post-hoc comparisons were made for subgroups of drivers who did and did not receive drowsiness warnings. Drivers who received a warning swerved more than drivers who did not receive a warning. Finally, acceptance scales showed that the system was evaluated to be very useful. This was in particular true for the drivers who received a drowsiness warning.

## Introduction

In 2000 over 40,000 people were killed and more than 1.7 million were injured in the European Union (EU) in road accidents. The directly measurable cost of road accidents is estimated at EUR 45 billion (EC White Paper, 2001). The European Commission has set itself the goal to reduce the number of people killed in traffic accidents between 2000 and 2010 with 50%. Partially this ambitious goal is to be achieved by the implementation of transport telematics. These applications, which are referred to as Advanced Driver Assistance Systems (ADAS), include systems for distance control, for lane keeping, for blind spot monitoring, and for monitoring driver alertness. One EU project that targets improved knowledge of the impact of various kinds of ADAS is the ADVISORS (Action for advanced Driver assistance and Vehicle control systems and Implementation, Standardisation, Optimum use of the Road network and Safety, GRD 1-1999-10047) project. The present study was part of this project; it assesses driver acceptance and response to a drowsiness monitoring system.

It is estimated that sleepiness, drowsiness or fatigue plays a causative role in approximately 10% of all accidents. On motorways this percentage is

In D. de Waard, K.A. Brookhuis, J. Moraal, and A. Toffetti (2002), *Human Factors in Transportation, Communication, Health, and the Workplace* (pp. 217 - 229). Maastricht, the Netherlands: Shaker.