

**Adaptive Cruise Control:  
individual differences and actual driving behaviour.**

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A proposed hierarchical framework of driver behaviour is used as a tool to make predictions about a drivers' needs, driving styles and driving behaviour reactions to driving with an adaptive cruise control system (ACC).

When introducing an ACC system some of the important issues in the adaptation process are the level of automation or the degree to which the driver is taken out of the control loop, the new role of the driver, the rate at which semi-critical events (the ones that the ACC cannot handle) develop, and the frequency with which these events tend to occur.

Research into the effects of Adaptive Cruise Control (ACC) on driving behaviour indicates that the system could be a promising new technology in traffic, but under certain conditions and limitations.

In the first place, driving behaviour with ACC can lead to positive effects in terms of traffic efficiency. Driving with ACC is found to reduce speed variability and initial individual differences in driving behaviour on motorways, which harmonises traffic. On top of this, acceptance results indicate that the distance kept to the vehicle in front does not influence the preferences of drivers. Even very short distances, which are shown to increase motorway capacity, are accepted very well.

Secondly, a more harmonised traffic pattern can also reduce the number of accidents and thereby increase traffic safety.

But with regard to traffic safety caution is also appropriate. Driving simulator experiments show that on motorways higher speeds and smaller headways are found when driving with ACC, which are factors known to increase accident likelihood.

Also potential safety hazards are found when ACC is switched on at rural roads. For instance, braking before crossings occurs at a later moment as compared to reference situations, and overtaking manoeuvres are more dangerous because of unexpected actions from the ACC system.

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