

The Design of Scenarios for the Study of Impaired Driving

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ABSTRACT

The National Advanced Driving Simulator for the last 6 years has used a standard set of driving scenarios to study impairment. The original impairment study involved alcohol, and we have further added sleep deprivation, distraction, and cannabis. A key point in most of these studies was to build a model of how people drive under these impairments. The study involved simulated drives that exposed the participant to typical driving situations, without strong guidance to the driver in terms of maintaining a certain speed and lane. The drives were sufficiently challenging to show levels of impairment. The participants would make multiple visits, given different levels of dosing/impairment. This caused a number of challenges, in terms of equivalency of the multiple events across multiple participants, and drives.

The NADS impairment scenario was originally constructed as a drive home from a bar, progressing from an urban setting, to an interstate setting, and finally to a rural setting. The drive was designed to present the participant with a series of typical driving events, a driver would likely see under normal driving situations. The events were designed in such a manner as to be largely speed independent meaning the driver would see the event the same way regardless of the test subject's speed. This was done with a combination of strict speed control with vehicles the driver would interact, and strict timing events. Overall we were able to design a very flexible set of driving scenarios that were very typical of normal driving conditions, and at the same time vary repeatable. Reproducible scenarios help reduce experimental variability, increasing experimental sensitivity