Methodological issues on the impact of central nervous disorders or psychotropic drugs on driving performance: An alcohol reference study in driving simulation.

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When evaluating driving fitness, a profile of various parameters referring to tactical and operational levels of the driving task should be considered.”

GENERAL CHALLENGES

1. Selection of empirical setting: epidemiological vs. experimental?
2. Selection of appropriate tests: Psychometric tests, on-road-tests, in real traffic, driving simulation?
3. Selection of appropriate endpoints: Type? Number?

PROMISING SOLUTION: Experimental studies in driving simulation

• Representative and sensitive scenarios can be systematically designed, presented and reproduced.
• Driving performance may be assessed as a whole by a profile of numerous endpoints that refer to the operational and tactical level of the driving task.
• Compensatory strategies can be practiced as in real traffic.

• Neither patients nor other road users are endangered.
• Due to its high face validity, simulation is well-acknowledged by subjects.
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RESULTS

At large, the completion of the test course was worse under the influence of alcohol reflected in total number of registered errors and overall assessments.

Parameters differentiated distinctly between the alcohol conditions depending on the underlying scenarios. Basically, operational parameters revealed to be more sensitive to these low BACs than tactical ones.

The authors report no conflicts of interest for this work.

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“Exemplary scenarios of the test course (scenario package “Driver Fitness and Ability”, DFA by SILAB):

- Tracking scenarios of varying difficulty to assess lane keeping (operational level).
- Cognitive demanding scenarios to assess gap acceptance, lane changes/selection, rules of priority etc. (tactical level).

CONCLUSIONS AND SUSTAINABILITY

Evaluating fitness to drive in driving simulators combines the advantages of classical psychometric test batteries and on road trials and solves the shortcomings. The usage of the DFA scenario package ensures that the test scenarios are representative and sensitive. For further studies on drug and disorder related effects on driving fitness, we recommend to evaluate driving performance as a whole by a profile-like analysis of various parameters at different levels of the driving task. The comparison with the impairing effects of 0.05% and 0.08% BACs helps to assess the clinical relevance of findings of other clinical studies.

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