Driving while fatigued in slippery road conditions - a neglected issue

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Introduction and Purpose

- Fatigued drivers have problems in keeping the vehicle within the lines (higher standard deviation of lateral position and more line crossing; e.g. Philip et al., 2005)
- Fatigued drivers less often make corrective steering wheel movements, which are, however, of higher amplitude (Thiffault & Bergeron, 2003; Verwey & Zaidel, 1999)
- Performing sudden or sharp steering movement on a slippery road is risky maneuver increasing the chance of losing the control of the vehicle.

-> Are fatigued drivers, compared to rested drivers, at higher risk when driving on slippery roads?

Methods

Twelve young men participated in a driving simulator experiment with two counter-balanced conditions: normal vs. slippery road x day (alert) vs. night (fatigued) driving. Time-on-task effects were also tested. An advanced moving-base driving simulator was used (Swedish National Road and Transport Research Institute, VTI, Linköping). The participants drove ca. 32km on a monotonous two-lane highway and rated their sleepiness seven times using Karolinska Sleepiness Scale (KSS). Standard deviation of lateral position (SDLP) was a measure of driving performance while blink durations (BD) were extracted from electrooculogram. Data was analyzed with mixed-effect multilevel ordinal logistic (KSS data) and linear regression models (SDLP and BD data).

Conclusions

The subjective sleepiness ratings indicate that driving in demanding road condition (i.e. slippery road) might further exhaust already sleepy drivers. This is not reflected in driving behaviour probably due to short driving duration in this experiment.

Limitations

The duration of the drive was kilometer based, not time based, so there was a variation in time on task. Small number of participants. Small effect sizes. How realistic was slippery condition?

References


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Results