Stress Research Institute

Stockholm University

In-car countermeasures open window and music revisited on the real road: popular but hardly effective against driver sleepiness

Johanna FA Schwarz[1], Michael Ingre[1], Carina Fors[2], Anna Anund[2], Jacques Taillard[3], Pierre Philip[3], Göran Kecklund[1], & Torbjörn Åkerstedt[1]

[1]Stress Research Institute, Stockholm University, Stockholm, Sweden, [2]The Swedish Road and Transport Institute, Linköping, Sweden, [3]University of Bordeaux, Bordeaux, France

Background

Sleepiness accounts for approximately 20% of motor vehicle accidents. Effective countermeasures against driver sleepiness could consequently add great benefit to traffic safety.

Aim

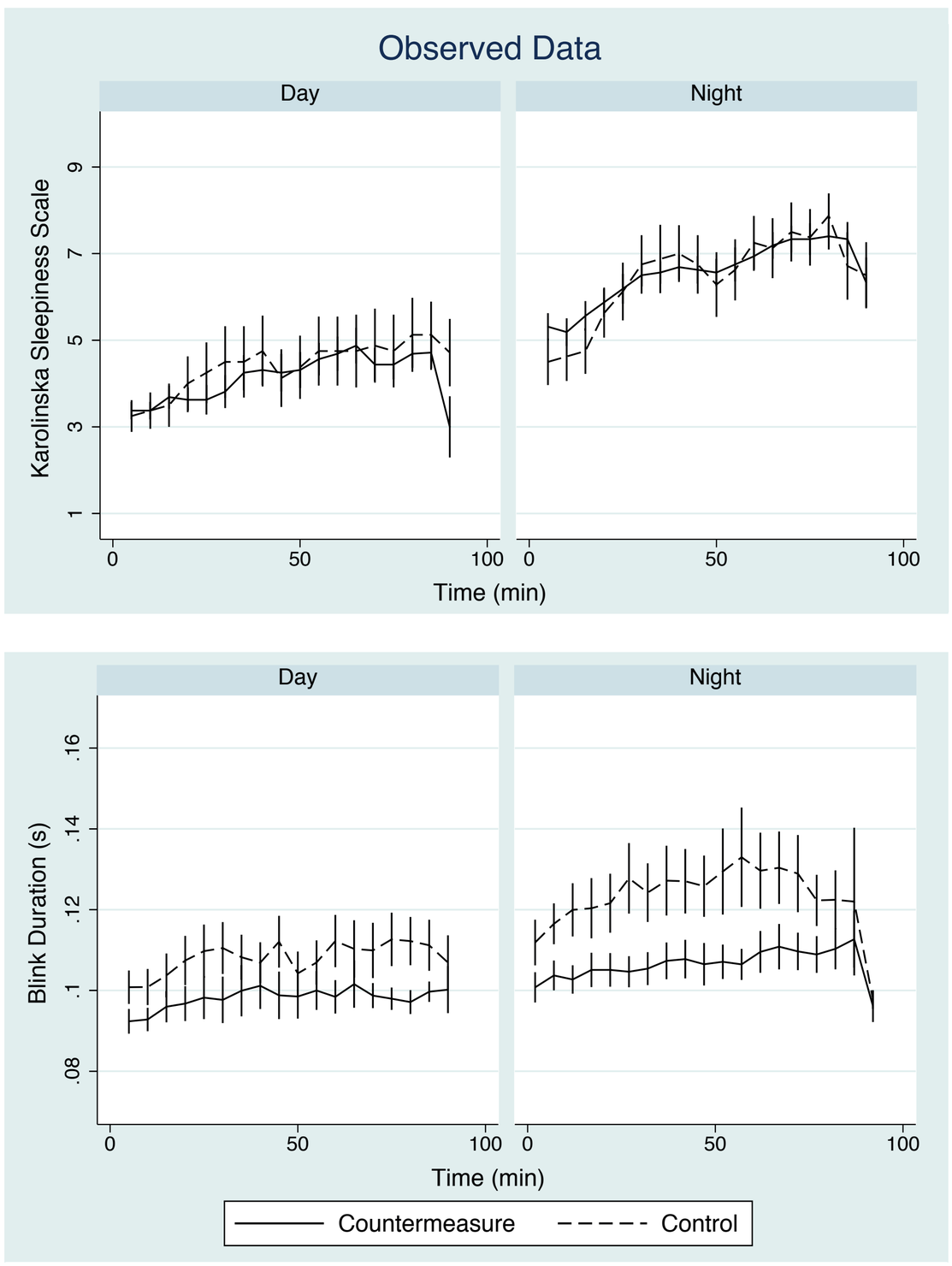
This study investigated if the popular in-car countermeasures opening the window (applied by 47% of drivers[a]) and listening to music (52%[a]) are effective countermeasures against sleepiness during real road driving.

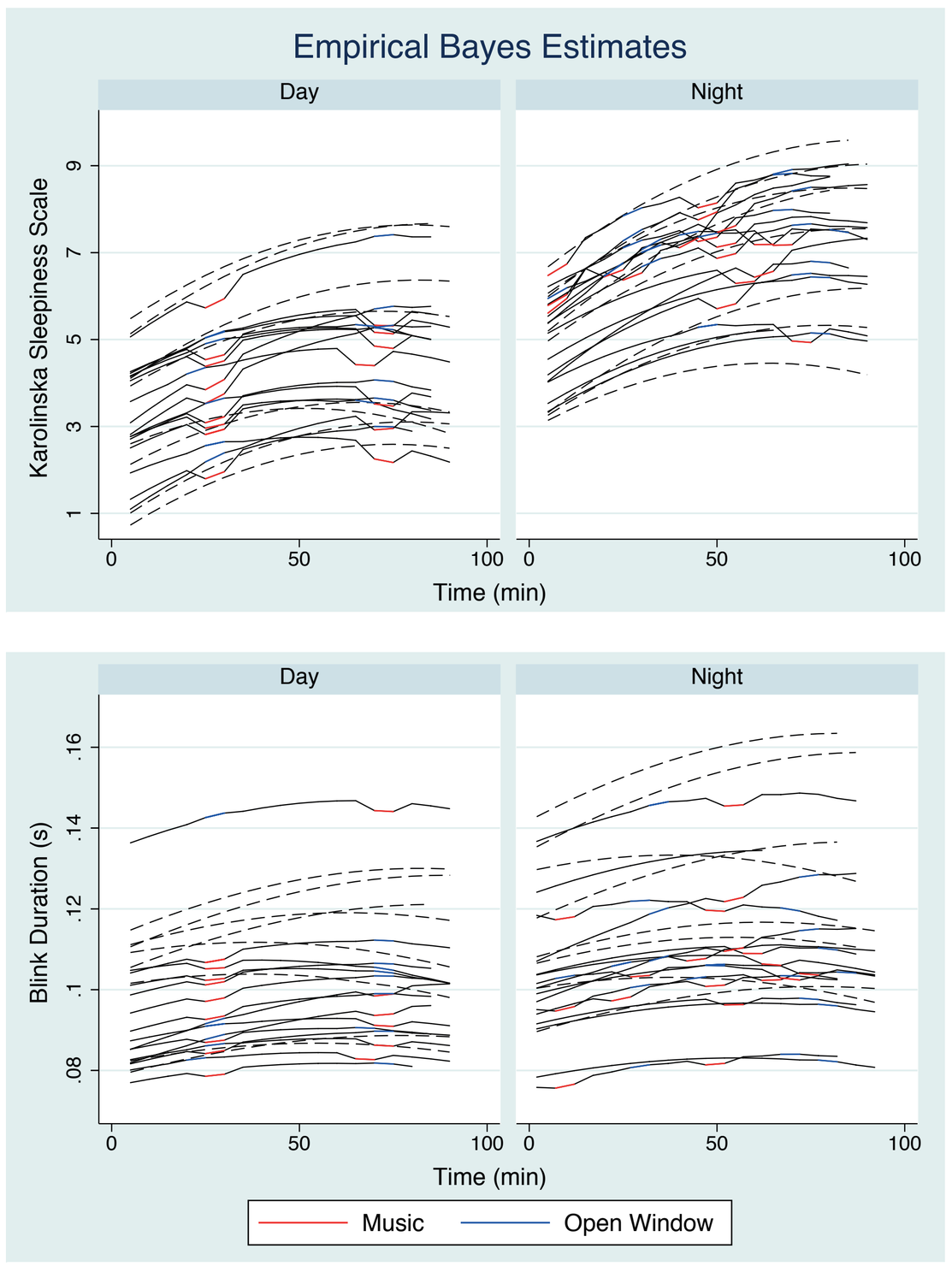
Result

Music had a significant, but modest acute effect on subjective and physiological sleepiness, whereas opening the window was ineffective in countering sleepiness during real road driving. The effects of night driving and driving duration were pronounced.

Conclusion

The in-car countermeasures opening the window and listening to music are presumably of little practical relevance in overcoming the substantial effects of nighttime and prolonged driving, and should not be used as sole countermeasures.





Methods

Sample

- Control group: 8 healthy participants (4 females, mean age+SD: 38.75+10.55years)
- Countermeasure group: 16 healthy participants (8 females, mean age+SD: 43.13+8.93years)

Experimental Design

- 90 min driving on a motorway during day and night
- The countermeasure group received the countermeasures (i) open window and (ii) music for 10 minutes in intermittent intervals. The timing was based on driving duration during the day, and subjective sleepiness during the night.

Measures

- Subjective sleepiness: Karolinska Sleepiness Scale (KSS) (every 5th minute)
- Physiological sleepiness: Blink duration

Statistical Analysis

- Multilevel mixed effects linear regression models
- Likelihood Ratio Tests were applied to evaluate nested models ($p<.05$)

Results

- The best-fitted models showed that subjective and physiological sleepiness were significantly affected by the countermeasures
- Open window and music were estimated to have differential effects
- The effect was limited to the actual countermeasure application interval and estimated to be minor compared to the pronounced effects of night driving and driving duration
- Karolinska Sleepiness Scale: estimated effect of music (-0.368 KSS steps), estimated effect of open window (+0.070 KSS steps), estimated effect of night driving (+1.827 KSS steps)
- Blink duration (log-transformed): estimated effect of music (-0.0163), estimated effect of open window (+0.0036), estimated effect of night driving (+0.1080)

a) Anund A, Kecklund G, Peters B, Åkerstedt T (2008) Driver sleepiness and individual differences in preferences for countermeasures. Journal of Sleep Research 17: 16-22.

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E-mail info@stressforskning.su.se **Website** www.stressresearch.se

CONTACT

Johanna Schwarz, Stress Research Institute, Stockholm University

E-mail johanna.schwarz@stressforskning.su.se **Phone** +46 8 5537 8932