

self-report issues related to fatigue, thus more objective measures would be highly beneficial.

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A PSYCHOMOTOR TRACKING TASK FOR FITNESS-FOR-DUTY TESTING FOR SLEEP DEPRIVED PERSONNEL

Park G,¹ Rosenthal T,¹ Guibert M,¹ Allen R,¹ May J,² Ware J³

(1) Systems Technology, Inc., Hawthorne, CA, USA, (2) Eastern Virginia Medical School, VA, USA, (3) Eastern Virginia Medical School, Norfolk, VA, USA

Introduction: A sleep deprivation (SD) study was conducted to determine simple, efficient measures of fitness-for-duty for sleep deprived personnel using a series of psychomotor, subjective, and physiological measures.

Methods: A total of 14 healthy participants (19-57 years, 7 females) completed 3 separate 24-hour counterbalanced visits sleeping for either 8, 4, or 0hrs. In the morning, participants completed a 60-minute driving simulator (DS) task involving a rural drive (Risser et al 2000), the Critical Tracking Task (CTT) (Allen *et al.*, 1999), the Psychomotor Vigilance Task (PVT), the Epworth Sleepiness Scale (ESS), Visual Analogue Scale (VAS), the Stanford Sleepiness Scale (SSS), and a one- nap sleep latency (ONSLT) trial.

Results: DS measures of average lateral lane deviations showed the best discrimination between 8, 4, and 0hr conditions but required utilizing the full 60 minutes of data. Reaction times for the 10 min PVT were only significant between the 8 and 0hr conditions. Averaging at 4-5 mins, the CTT data provided significant differences between the 8 and 0hr ($p = .002$) and 4 and 0hr ($p = .032$) conditions; 8hr: $M = 3.40$, $SD = .428$, 4hr: $M = 3.40$, $SD = .383$, 0hr: $M = 3.40$, $SD = .362$. Sleep questionnaires VAS and SSS provided good discrimination between all three SD conditions. The ESS, similar to the CTT was not sensitive between the 8 and 4hr conditions. The ONSLT, similar to the PVT results was sensitive only between the 8 and 0hr conditions.

Conclusion: Taking into account testing sensitivity and efficiency, the CTT provided the most potential as a fitness-for-duty measure for sleep deprived personnel in realworld applications. However, sensitivity differences between SD conditions suggest the CTT to have an alerting effect and to be more sensitive as SD becomes more severe.

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THE INFLUENCE OF SLEEP DEPRIVATION ON PSYCHOMOTOR PERFORMANCE IN NURSES WHO WORK THE NIGHT SHIFT

Johnson A, Umlauf M, Brown K, Weaver M

University of Alabama at Birmingham, Birmingham, AL, USA

Introduction: Reduction in the amount of sleep predisposes individuals to sleep deprivation, resulting in poor psychomotor performance. Nurses who work the night shift may be particularly subject to sleep deprivation because of irregularity of sleep hours and disruptions in the circadian cycle. Few studies discuss the influence of sleep deprivation among nurses and how sleep deprivation influences psychomotor performance. Poor psychomotor performance has been associated with an increase in error. Increased error can be translated into an unsafe work environment. The identification of sleep deprivation in nurses is

essential for maintaining a safe work environment.

Methods: The d2 test of attention, a timed pencil and paper letter recognition psychomotor performance test was administered with the Profile of Mood States, the Pittsburgh Sleep Quality index, and a demographic questionnaire to nurses while they were working on the night shift in the hospital setting. The sample was classified as sleep deprived or not sleep deprived.

Results: The sample of 289-licensed nurses was predominantly female. Fifty six percent of the sample was sleep deprived. While there was no significant difference in psychomotor performance scores between the sleep deprived and the non-sleep deprived groups, the mean psychomotor performance scores in both groups were above than the normative mean (26.6 male, 11.4 female) for male (44.4) and female (41.03). There was also a significant ($p < 0.0001$) inverse relationship between psychomotor performance and hours of sleep.

Conclusion: The total sample of night shift nurses revealed poor psychomotor performance scores. Sleep deprived nurses who worked the night shift had poorer sleep quality ($p = 0.0006$) and lower mood states ($p = 0.0094$). As the hours of sleep decreased the psychomotor performance declined.

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Role: Award Recipient

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CHANGES IN EYE-STEERING COORDINATION OF SLEEP-DEPRIVED DRIVERS COULD HELP AVOID ACCIDENTS DUE TO FALLING ASLEEP AT THE WHEEL

Chattington M, Wilson M, Marple-Horvat D

Manchester Metropolitan University, Alsager, Cheshire, United Kingdom

Introduction: Driving requires coordination of horizontal eye movements and steering. This study analyses the change in coordination when drivers have been sleep-deprived for one night. These changes could be detected before a driver falls asleep, and a warning given so as to avoid the impending accident.

Methods: Local ethical committee approval and written informed consent were obtained prior to testing. Six participants (3 male, 3 female, mean age 21.1 years) drove a winding route on a driving simulator. On day 1 (control) they drove for 1 hour starting at 5pm. They were kept awake the following night, and on day 2 (test) drove again from 5pm for up to two and a half hours. Their eye movements were monitored using a dashboard mounted eye tracker (ASL 5000 pan-tilt camera), and steering wheel movement was monitored through a precision potentiometer attached to the steering column. Cross-correlation signal analysis of successive 1 minute epochs of driving yielded degree of covariation and relative timing of eye and steering movements.

Results: In all drivers, sleep deprivation impacted their ability to coordinate eye movements with steering. There were instances of both acute and chronic reductions ($P < 0.05$) in degree of coordination and in time lead of eye movements over steering. Acute drops were correlation coefficient or time lead values in any 1 minute period of driving that fell below the (mean-2SD) limit defined by 45 minutes of normal driving. Chronic reductions were identified by paired t-test comparison of 45 minutes of normal and sleep-deprived driving.

Conclusion: Changes in eye-steering coordination were identified

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