

# New study finds shifted sleep-wake cycles affect women more than men

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Credit: Vera Kratochvil/public domain

A new study from the Surrey Sleep Research Centre at the University of

Surrey, published today in the journal *PNAS (Proceedings of the National Academy of Sciences)* has found that shifted sleep-wake cycles affect men and women's brain function differently.

Researchers placed 16 male and 18 female participants on 28-hour days in a controlled environment without natural light-dark cycles, at the Surrey Clinical Research Centre. This effectively desynchronised the sleep-wake cycle from the brain's 24-hour (circadian) clock, similar to jet lag or a shiftwork scenario.

Every three hours during the awake period, participants performed a wide range of tests, including self-reported assessments of sleepiness, mood and effort, and objective tests of cognitive performance which included measures of attention, motor control and working memory. Brain electric activity (EEG) was monitored continuously during sleep. The results revealed that in both men and women self-reported assessments were more sensitive to the effects of time awake and [circadian clock](#) than the many objective measures of performance. However, crucially, the circadian effect on performance was significantly stronger in women than in men such that women were more cognitively impaired during the early morning hours, which in the real world typically coincides with the end of a night shift.

Co-author, Dr Nayantara Santhi from the University of Surrey, said, "We show for the first time that challenging the circadian clock affects the performance of men and women differently. Our research findings are significant in view of shiftwork-related cognitive deficits and changes in mood. Extrapolation of these results would suggest that women may be more affected by night-shift work than men."

Senior author, Professor Derk-Jan Dijk, continued, "These results show that in both men and women circadian rhythmicity affects brain function and that these effects differ between the sexes in a quantitative manner

for some measures of brain function."

"Overall the findings illustrate how important it is to include both men and [women](#) in research studies and to use a wide range of subjective and objective indicators of [brain function](#)," added Professor Dijk.

**More information:** Sex differences in the circadian regulation of sleep and waking cognition in humans, *PNAS*, [www.pnas.org/cgi/doi/10.1073/pnas.1521637113](http://www.pnas.org/cgi/doi/10.1073/pnas.1521637113)

Provided by University of Surrey

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