

Sleep state misperception mispercieved

ABSTRACT:

Background

Whereas psychophysiological insomnia is the most common health complaint and has serious consequences, the neural correlates of altered perception and consciousness are insufficiently known.

Aim of the study

We here aimed to evaluate electroencephalographic (EEG) markers of hyperarousal, cortical inhibition and attentional filtering during resting state.

Method

High-density EEG and electrocardiography (ECG) were recorded in up to 51 people complaining about insomnia and 43 matched controls. Analyses including source estimation quantified the spatiotemporal, spectral, and long-range temporal correlation (LRTC) properties of the EEG during resting state, including Heartbeat Evoked Potentials (HEP).

Results

People that complain about insomnia showed less power in a narrow upper alpha band around 11.7 Hz over bilateral frontal and left temporal regions. They moreover showed more power in a broad beta frequency range (16.3-40 Hz) across the scalp. In addition, they showed a larger amplitude late HEP component than controls at frontal electrodes 376-500 ms after the R-wave peak in anterior cingulate/medial frontal cortices. Finally, individuals who experienced worse sleep quality had stronger LRTC.

Conclusions

The findings suggest hyperarousal, insufficient cerebral cortical inhibition and attentional filtering, and insufficient interoceptive adaptation of their brain responses to the ever-present heartbeats. The findings provide insight into the neural correlates of sleep complaints including enhanced awareness that could underlie sleep state misperception.

Keywords

Psychophysiological insomnia, High-density EEG, Sleep misperception, Consciousness

Published Work:

Colombo, M., Ramautar, J., Wei, Y., Gomez-Herrero, G., Stoffers, D., Wassing, R., Benjamins, J. S., Tagliazucchi, E., van der Werf, Y., Cajochen, C., & Van Someren, E. (2016). Wake high-density electroencephalographic spatio-spectral signatures of insomnia. *Sleep*, 39(5), 1015-1027. doi: 10.5665/sleep.5744

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Colombo, M., Wei, Y., Ramautar, J., Linkenkaer-Hansen, K., Tagliazucchi, E., & Van Someren, E. (2016). More severe insomnia complaints in people with stronger long-range temporal correlations in wake resting-state EEG. *Frontiers in Physiology*, 7:576. doi: 10.3389/fphys.2016.00576

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