

Sleeping body, sentient mind? Searching for the neural bases of conscious experiences during sleep

ABSTRACT:

Background

Sleep and interoception are important regulating processes of physiological homeostasis and of consciousness. However, few studies have investigated the relationship between them. People with insomnia chronically experience their sleep as conscious wakefulness, which we hypothesize could involve interoception-related neural dysfunctions.

Aim

By incorporating EEG, neuroimaging, and questionnaire data, we aim to establish direct links between interoception and the experience of (un)consciousness during sleep.

Method

Measures of brain network activity including EEG microstate properties and BOLD functional connectivity variability, as well as brain connectivity networks derived from diffusion MRI tractography, were compared between people with insomnia and people without sleep complaints. Self-reported measures were collected in a community-based sample and used to investigate the relationship between somatic complaints and insomnia severity.

Results

The mean duration of a particular class of EEG microstates previously linked to salience network activity is reduced in people with insomnia. Functional connectivity variability between the anterior salience network and the left executive control network is reduced in people with insomnia. People with insomnia show brain structural hyperconnectivity in a subnetwork anchored at the right angular gyrus. Poor sleep and somatic complaints mutually reinforce each other while their relationship is modulated by habitual insomnia severity.

Conclusions

There is a tight relationship between sleep and interoception. Experience of consciousness during sleep involves aberrant dynamics of the salience network, a key network for interoception.

Keywords

Sleep, Insomnia, Consciousness, Interoception, Salience network

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Published Work:

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