Altered brain connectivity in Insomnia Disorder

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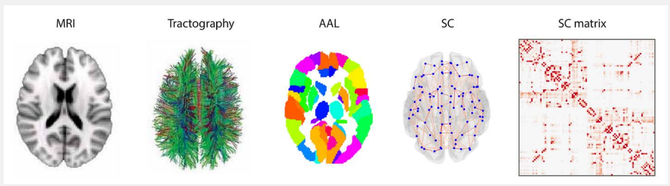
Introduction

- Insomnia Disorder is the second most prevalent mental disorder, and it involves both sleep difficulties and daytime complaints[1].
- The neural underpinnings of Insomnia Disorder remain elusive, and existing neuroimaging studies are limited by their focus on local measures and specific regions of interest[2].
- To address this shortcoming, we applied a data-driven approach to assess whole-brain structural connectivity alterations in adults with Insomnia Disorder.

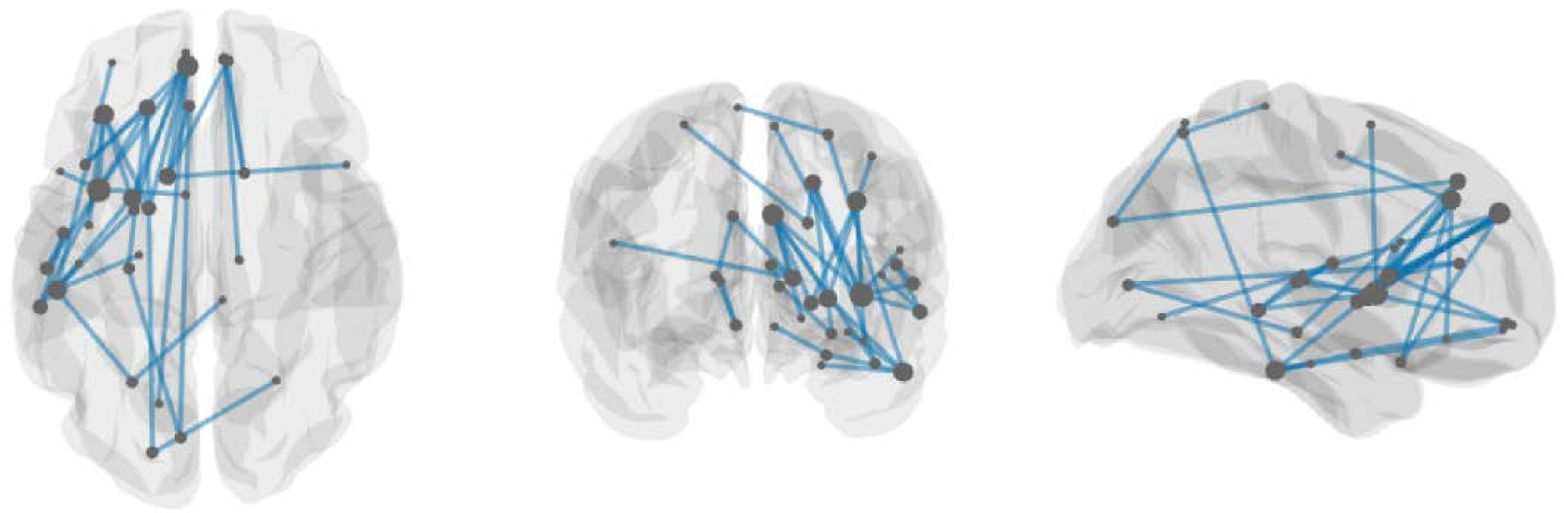
Methods



- We used a cross-sectional design to compare adults with Insomnia Disorder (n=16) to matched controls (n=14).
- Anatomical scans and diffusion tensor imaging were obtained using a Siemens Trio 3T MR scanner.
- The AAL atlas was used for co-registration and we applied probabilistic tractography to assess whole-brain structural connectivity.

Differences in structural connectivity between groups were examined using Network-Based Statistics.

Insomnia Disorder
is characterized by a network
of reduced structural connectivity

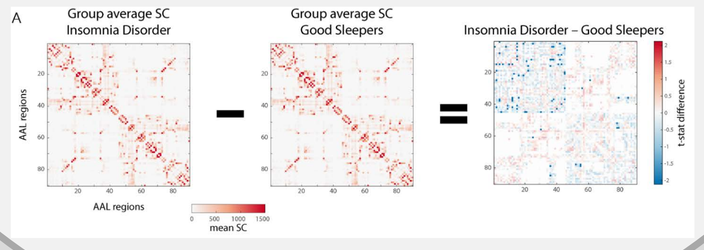


The significant network included mainly fronto-subcortical connections with left insula as a key region

Results

Participants with Insomnia Disorder had reduced structural connectivity in a brain network including 34 regions and 39 structural links between them (t-threshold 2.6, p = 0.014) [3].

The network was largely left-lateralized with a predominance of fronto-subcortical connections and the left insula as the region with the highest degree (i.e. the largest number of connections within the significant network).



Conclusions

- Insomnia is one of the most prevalent health problems in modern society.
- Using a data-driven approach, we found that Insomnia Disorder is characterized by a network of reduced structural connectivity.
- The findings demonstrate changes in brain connectivity at the structural level that form the anatomical ‘backbone’ of functional connectivity in areas related to interoception, emotional processing, stress responses and the initiation of slow wave sleep.

References
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