Effects of sleepiness on resting-state connectivity

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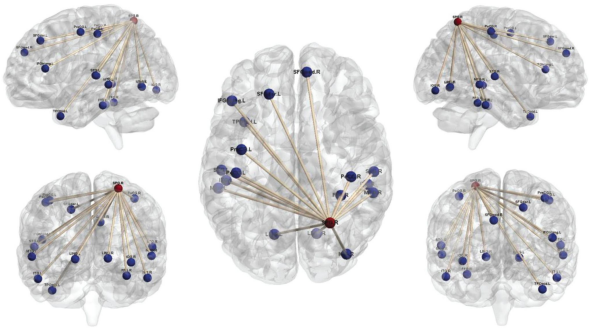
Background

- Sleep deprivation is commonplace in society
- Sleepiness has effects on cognitive and affective functioning:
  - Associations with amygdala-prefrontal functional connectivity
  - Inhibition of top-down-control in emotion
- Further analysis on functional connectivity

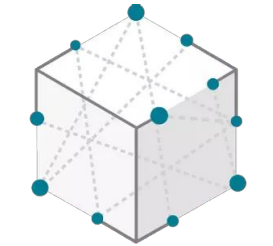
Main Question

Can resting-state functional connectivity predict sleep deprivation?



Data:

- What? Resting state fMRI from the Stockholm Sleepy Brain Study: Effects of Sleep Deprivation on Cognitive and Emotional Processing in Young and Old.
- Why? Investigation on the effects of partial sleep deprivation (PSD) on resting state brain connectivity.
- Where? OpenNeuro



Tools & Methods

- Git and GitHub for project management
- DataLad for retrieval and version control of data
- BIDS-validator to check updated dataset integrity
- FMRIPrep for data preprocessing
- Python (visualization, machine learning, …)

Objectives

- Familiarize myself with neuroimaging data organization and open science practices
- Learn reproductible neuroimaging workflow from preprocessing to data visualization
- Visualize and compare functional connectomes of resting-state networks
- Prospect: Build a machine learning model

Deliverables

- GitHub repository containing all the elements of the project
- Markdown file for the project description
- Bash code for fMRI preprocessing
- Requirements file to specify the Python environment
- Jupyter notebook for visualization (and machine learning)

References

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- Gustav Nilsonne and Sandra Tamm and Paolo d'Onofrio and Hanna Å Thuné and Johanna Schwarz and Catharina Lavebratt and Jia Jia Liu and Kristoffer NT Månsson and Tina Sundelin and John Axelsson and Peter Fransson and Göran Kecklund and Håkan Fischer and Mats Lekander and Torbjörn Åkerstedt (2020). The Stockholm Sleepy Brain Study: Effects of Sleep Deprivation on Cognitive and Emotional Processing in Young and Old. OpenNeuro. [Dataset] doi: 10.18112/openneuro.ds000201.v1.0.3
- Tamm S, Schwarz J, Thuné H, Kecklund G, Petrovic P, Åkerstedt T, Fischer H, Lekander M, Nilsonne G. A combined fMRI and EMG study of emotional contagion following partial sleep deprivation in young and older humans. Sci Rep. 2020 Oct 21;10(1):17944. doi: 10.1038/s41598-020-74489-9. PMID: 33087746; PMCID: PMC7578048.