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Multiverse Analysis: Conceptualisation Activity

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The schedule for the afternoon

- 13:30-15:00: Multiverse Analysis Theory and Conceptualisation
- 15:00-15:30: Coffee break
- 15:30-17:00: Multiverse Analysis in Neuroimaging
- 17:00-18:00: Conceptualisation activity

Conceptualisation Activity

- EEG Multiverse Analysis
  - Construct a multiverse analysis for one of your EEG projects, or
  - Construct a multiverse analysis for our example (next slides)
- fMRI Multiverse Analysis
  - Construct a multiverse analysis for one of your fMRI projects, or
  - Construct a multiverse analysis for our example (next slides)

We will discuss your garden of forking paths together.

Conceptualisation Activity - EEG

EEG multiverse analysis example

Model:

Extraversion ~ *f*(happiness LPP - neutral, anger LPP - neutral, fear LPP - neutral, surprise LPP - neutral, sadness LPP - neutral, disgust LPP – neutral)

Data:

Sample: 98 healthy adults (M_{age} = 26.64, SD_{age} = 4.82)

Extraversion: NEO Personality Inventory Revised (M = 2.26, SD = 0.43)

Emotion recognition task with EEG recording:

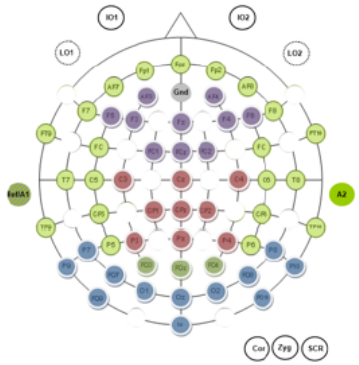
6 dynamic emotional expressions

- *happiness, sadness, anger, fear, disgust, surprise*

1 dynamic neutral expression

- *either chewing or blinking*

42 EEG electrodes



Conceptualisation Activity - fMRI

Goal

Classify autistic individuals from healthy controls using functional connectivity (FC) from resting-state fMRI data with a logistic regression model.

Data

- **Sample:** 100 participants (50 autistic, 50 healthy controls)
- **Task:** Resting-state fMRI recording

Your Task

Given this research aim, design your multiverse analysis (containing a number of defensible pipelines) based on the analytical decisions available on the next slide.

Conceptualisation Activity - fMRI

Decision Node	Options
Removal of N initial volumes	No, 4, 16, 32
Slice timing correction	No, Yes
Motion realignment	No, Yes (using mean as reference), Yes (using first volume as reference), Yes (using median as reference)
Intensity normalization	No, Yes
Motion regression	No, 6 parameter, 12 parameter, 24 parameter
Scrubbing	No, Yes
Tissue signal regression	No, mean WM and CSF, Compcor
Detrending	No, linear, quadratic, linear and quadratic
Parcellation	AAL, Schaefer 200, Schaefer 400, Schaefer 800, Desenbach 160
Band-pass filtering (0.01-0.1Hz)	No, Yes
Global signal regression	No, Yes
Connectivity measure	Pearson corr, partial corr.

Don't get lost in the Garden of Forking paths

Think carefully about the analytical choices you can make!

Thank you for attending this workshop!

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