

Explainable Multimodal prediction of treatment-resistance in patients with depression

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INTRO:

1. Background

- Predicting the course of depression is necessary for personalized treatment
- Artificial intelligence (AI) systems leveraging multiple data sources were introduced as a viable method for prediction in psychiatry

2. Objectives

- This study aimed to predict treatment-resistant depression at the time of depression diagnosis leveraging structured common data model (CDM) data, brain morphometry and natural language processing.

METHODS:

- The study population
 - Individuals firstly diagnosed with depression
 - Index date was the date of first depression diagnosis
- The outcome for prediction
 - Treatment resistance after diagnosis of depression (when three types of antidepressants are used)
- Model
 - PLP framework (XGBoost)
 - Features were captured within one year prior to the index date
- Data
 - Ajou University Medical Center (CDM structural data, brain MR data, clinical text data)

RESULTS:

- The mean interval for outcome was 547 days
- Best performance in all types data (AUROC = 0.794)

Models using brain imaging and natural text could effectively predict treatment resistance in individuals firstly diagnosed with major depressive disorders

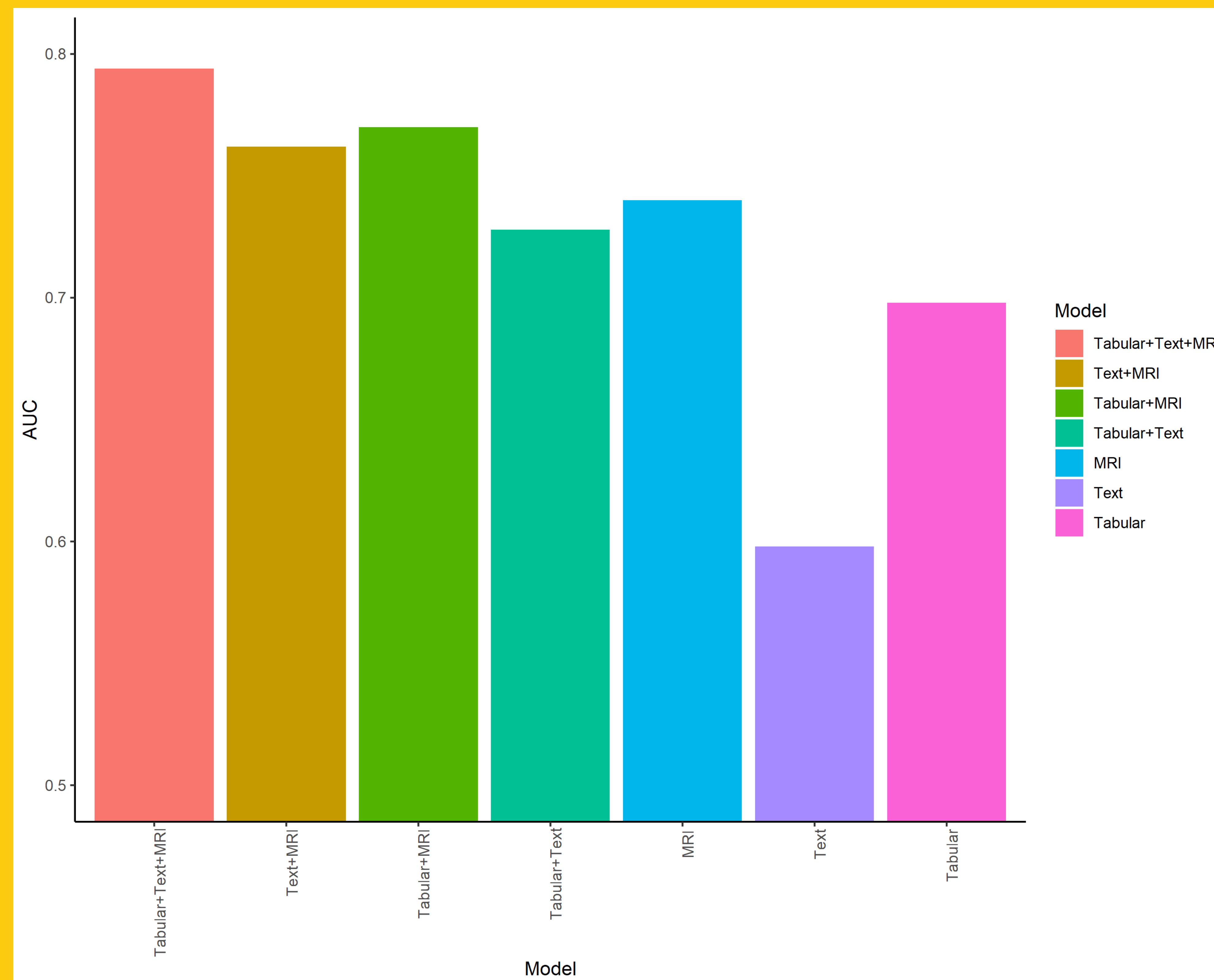


Figure 3. Performance of machine learning models for treatment-resistant depression according to data types

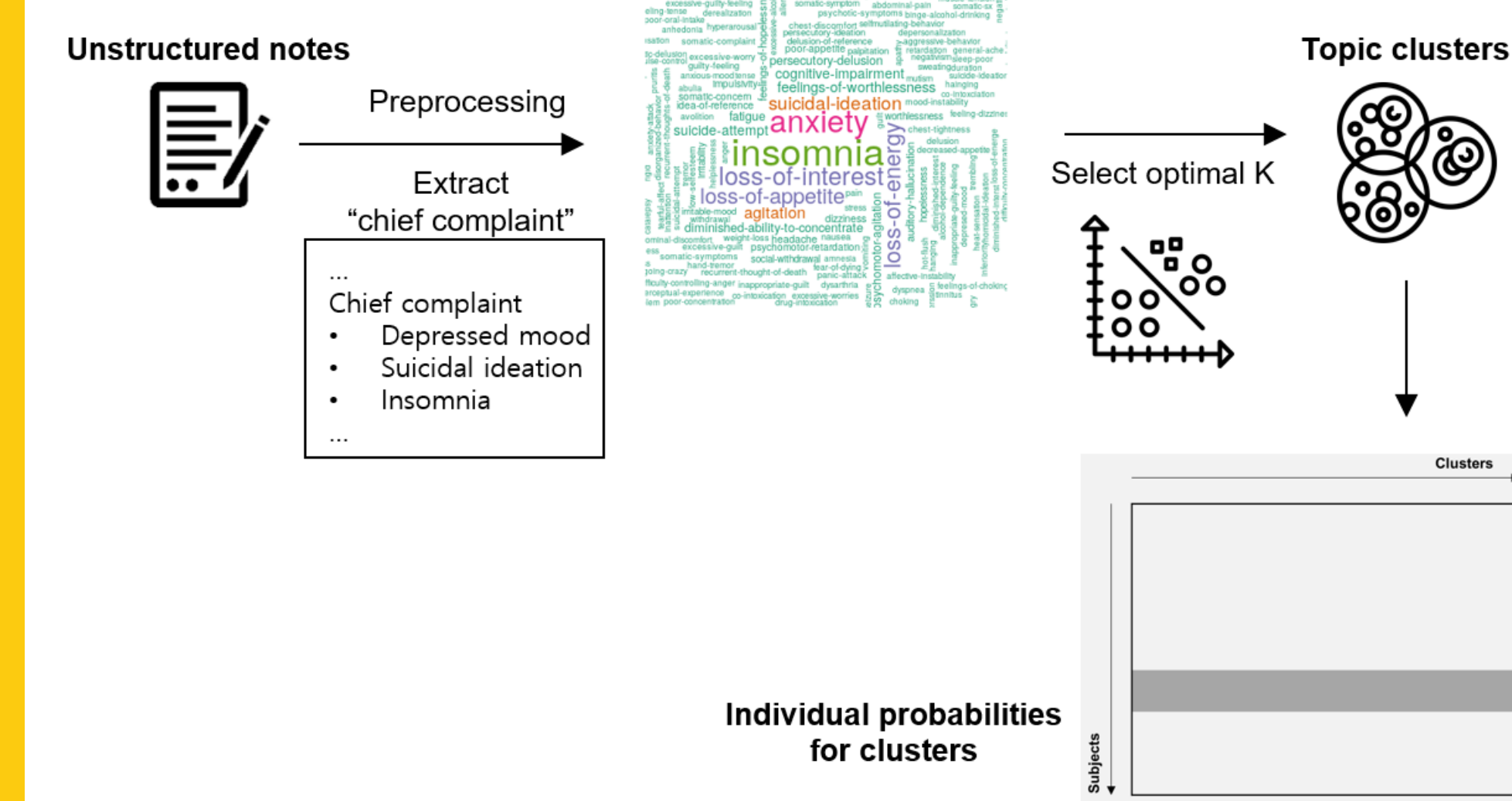


Figure 1. The schematic view of NLP analysis

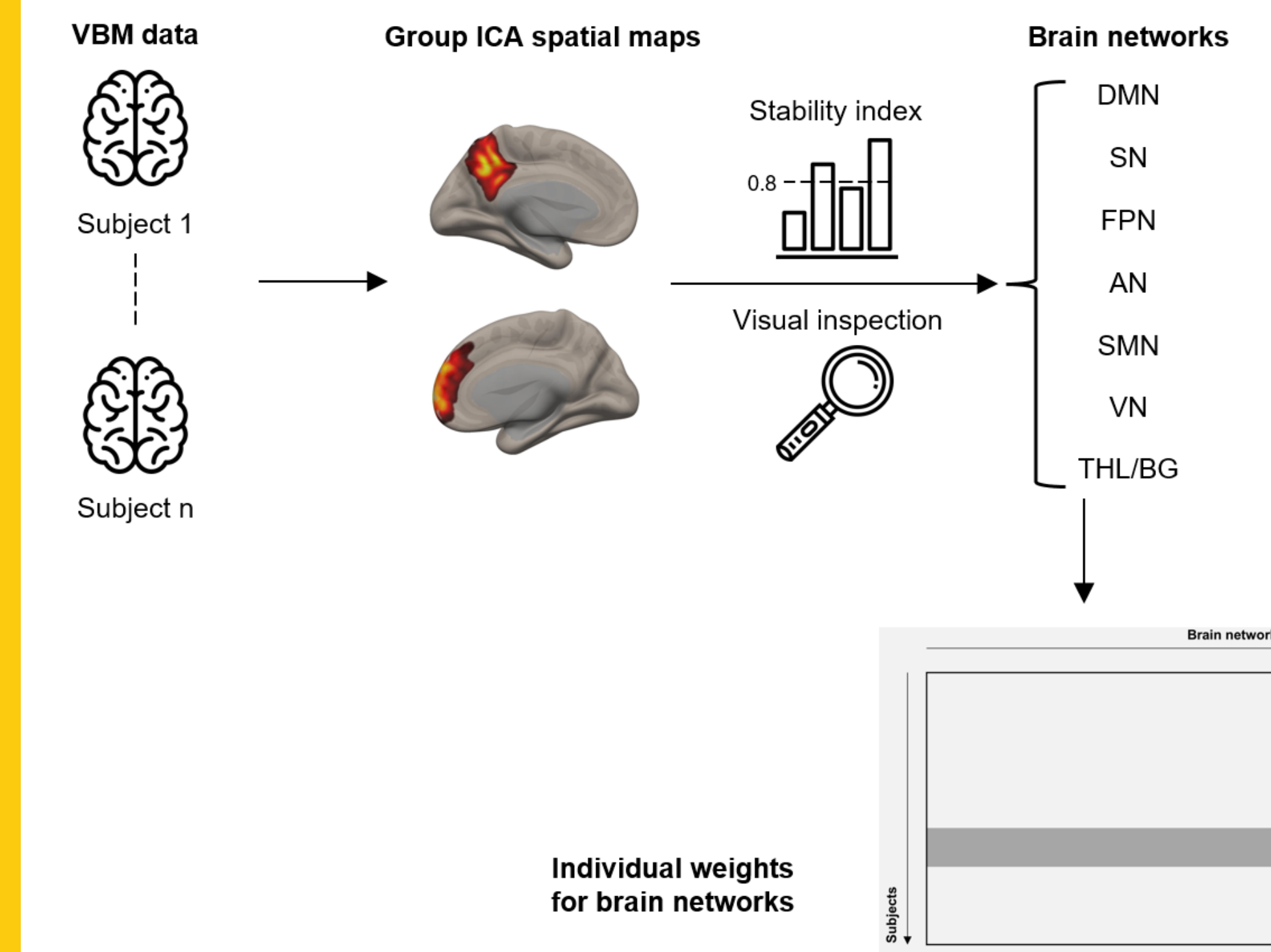


Figure 2. The schematic view of brain MR analysis

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This research was funded a grant from the Korea Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the Ministry of Health & Welfare, Republic of Korea (grant number: HR16C0001).



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