

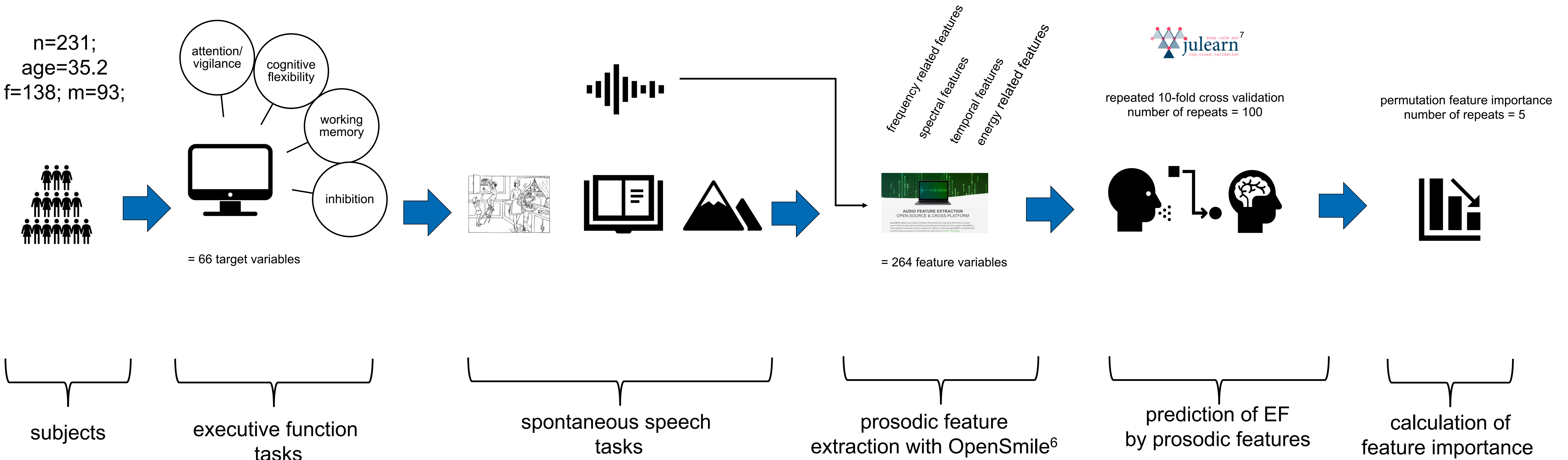
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Introduction

- Previous research has established a connection between executive function (EF) performance and prosody in numerous disorders^{1, 2, 3, 4, 5}.
- However, all findings are based on patient studies solely, and it remains unclear how all the different subdomains of EF and prosody are related to each other.
- The present study aims at exploring the functional, nonlinear relationships of EF and prosody using a machine learning regression approach to predict EF performance from various prosodic features.

Methods



Results

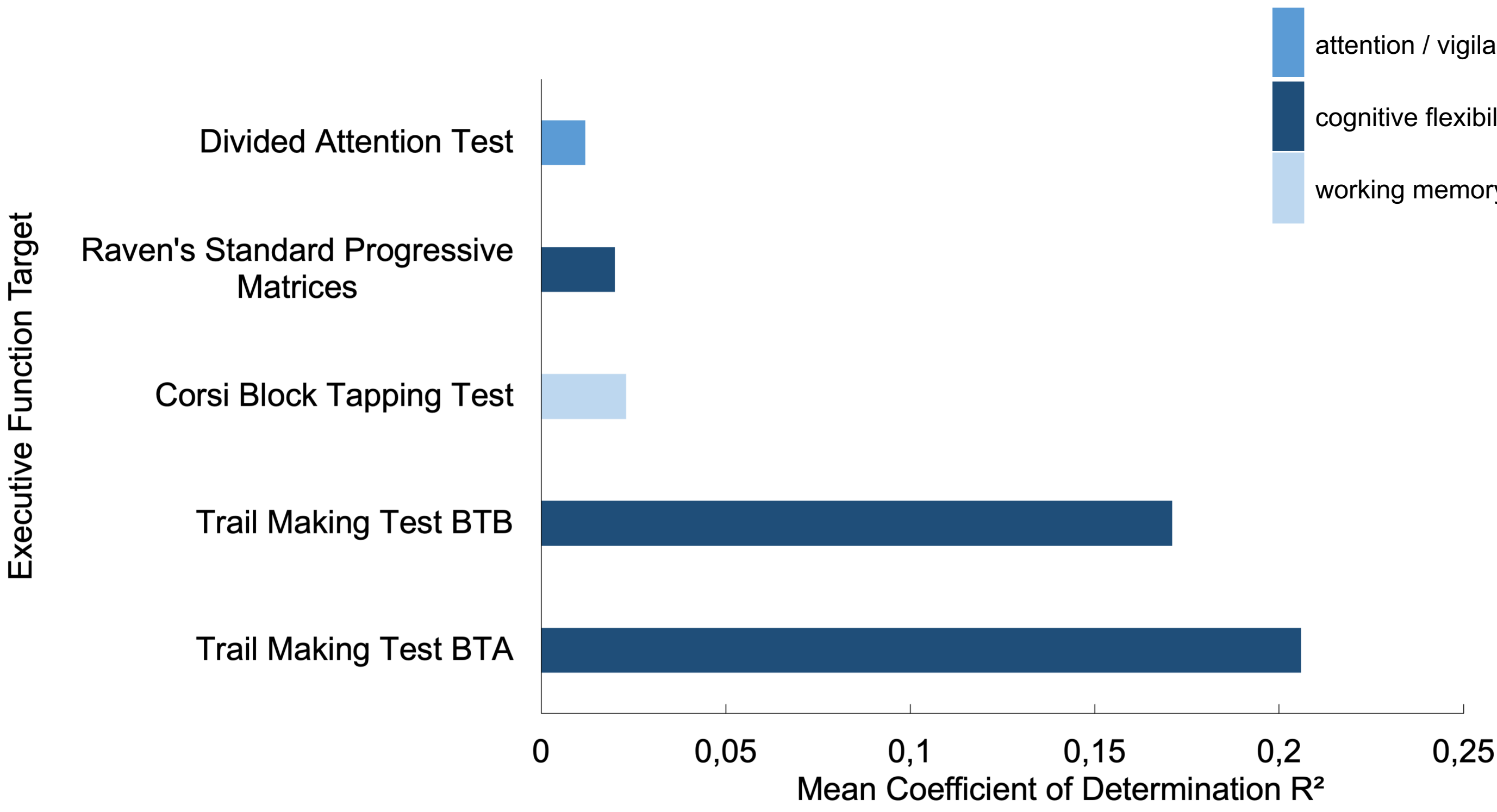


Figure 1. Executive function targets with positive R² values for cross-validation. Valid model fit, measured by coefficient of determination (R²), is shown for five EF variables related to cognitive flexibility, working memory, and attention/vigilance. Invalid model fit is displayed for 61 EF variables.

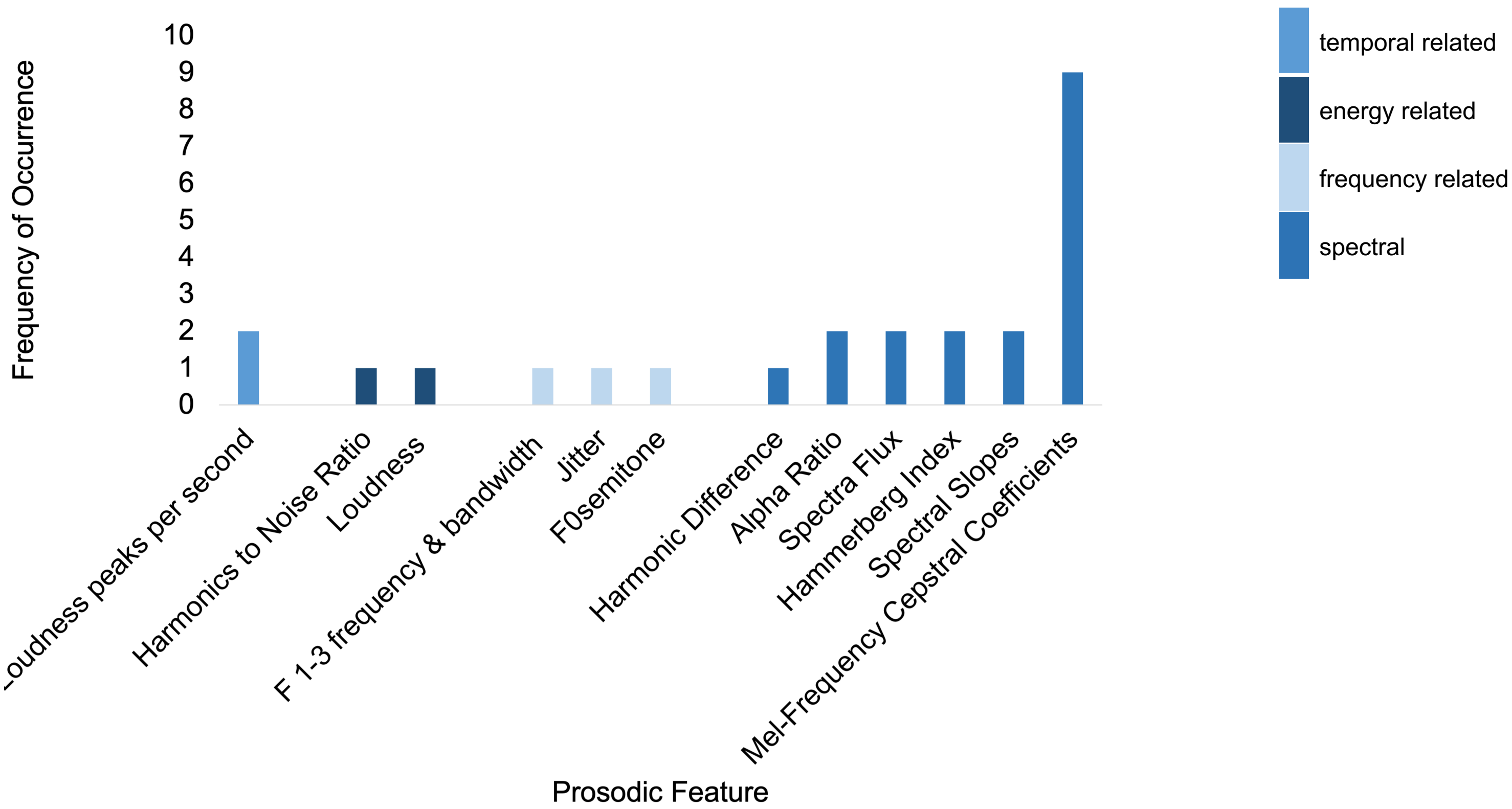


Figure 2. Frequency of occurrence of the most predictive features. Results of the permutation feature importance analyses suggest that the spectral prosodic parameters, especially the Mel Frequency Cepstral Coefficients, are most predictive.

Discussion

- In line with previous clinical studies in different patient populations^{1, 3}, the outcome of the present study provides insights into the specific relationships between prosody and the different EF subdomains.
- The experiment indicated the possibility that the predictive power of prosody may be a crucial biomarker in relation to executive impairment in the future.
- Further research should be undertaken to investigate whether EF performance can be predicted in an independent data set.

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