SELF-CAUGHT MIND BLANKING EPISODES RESEMBLE ATTRIBUTES OF PROBED MIND BLANKING REPORTS

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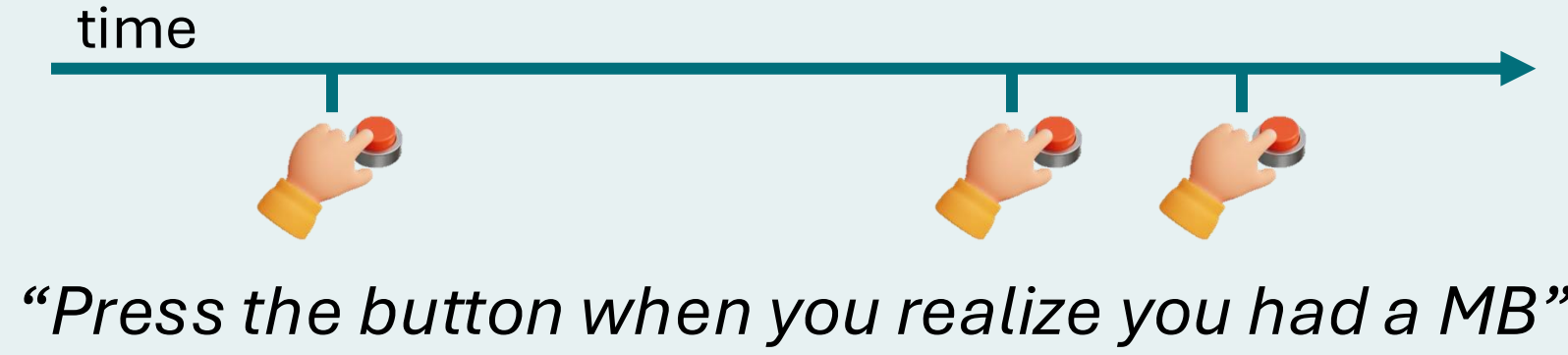
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Introduction

- Mind blanking (MB): mental state of empty mind or with no reportable content [1].
- MB is mainly quantified using probes [2-3].
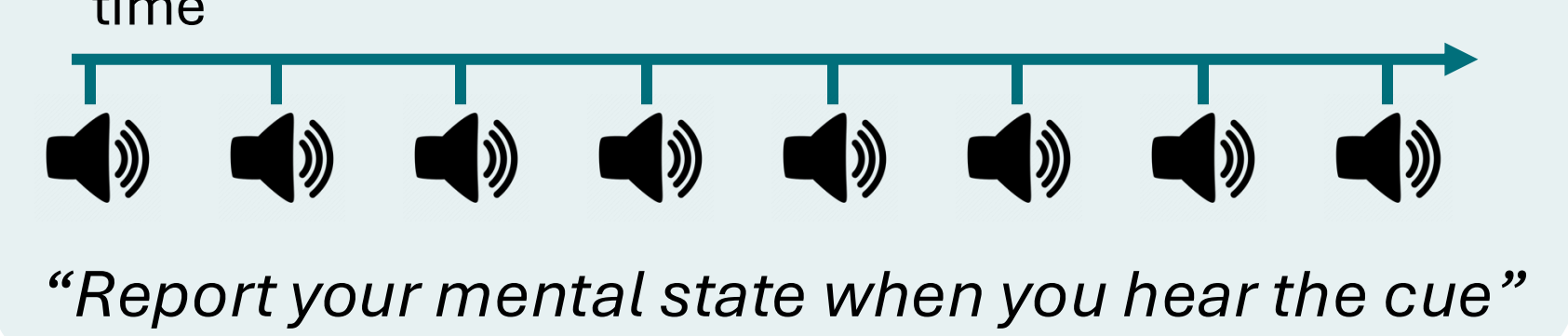- H: self-caught MB resembles probed MB.

Methods

Within-subject design (3T fMRI)

N = 21
Healthy participants
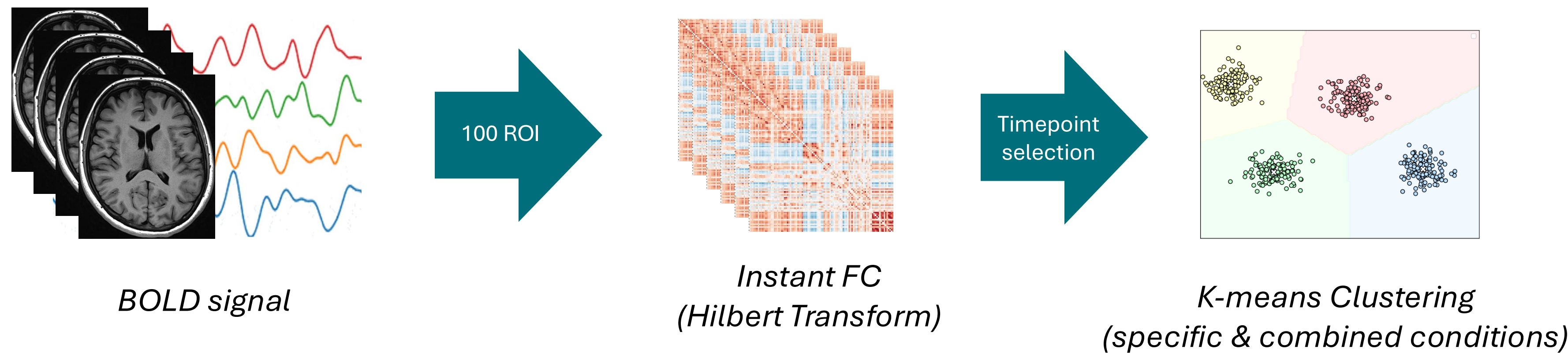age: 29 ± 4; 48% female

Self-caught MB (scMB)

time

"Press the button when you realize you had a MB"

Probed MB (pMB)

time

"Report your mental state when you hear the cue"

Analysis

BOLD signal → 100 ROI → Instant FC (Hilbert Transform) → Timepoint selection → K-means Clustering (specific & combined conditions)
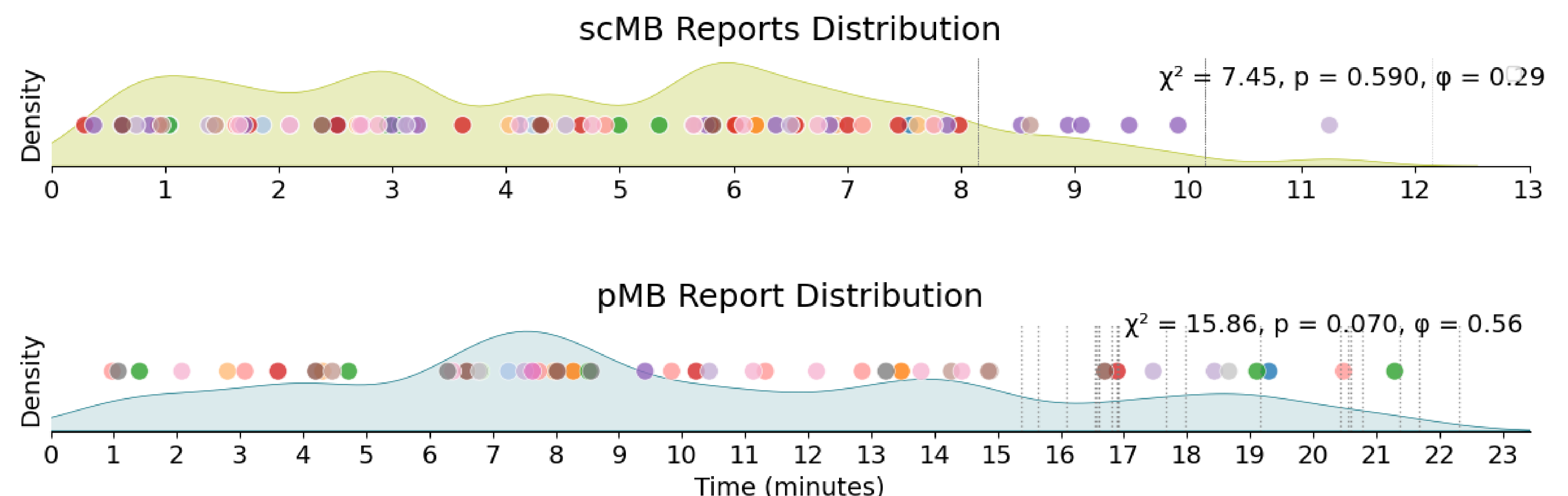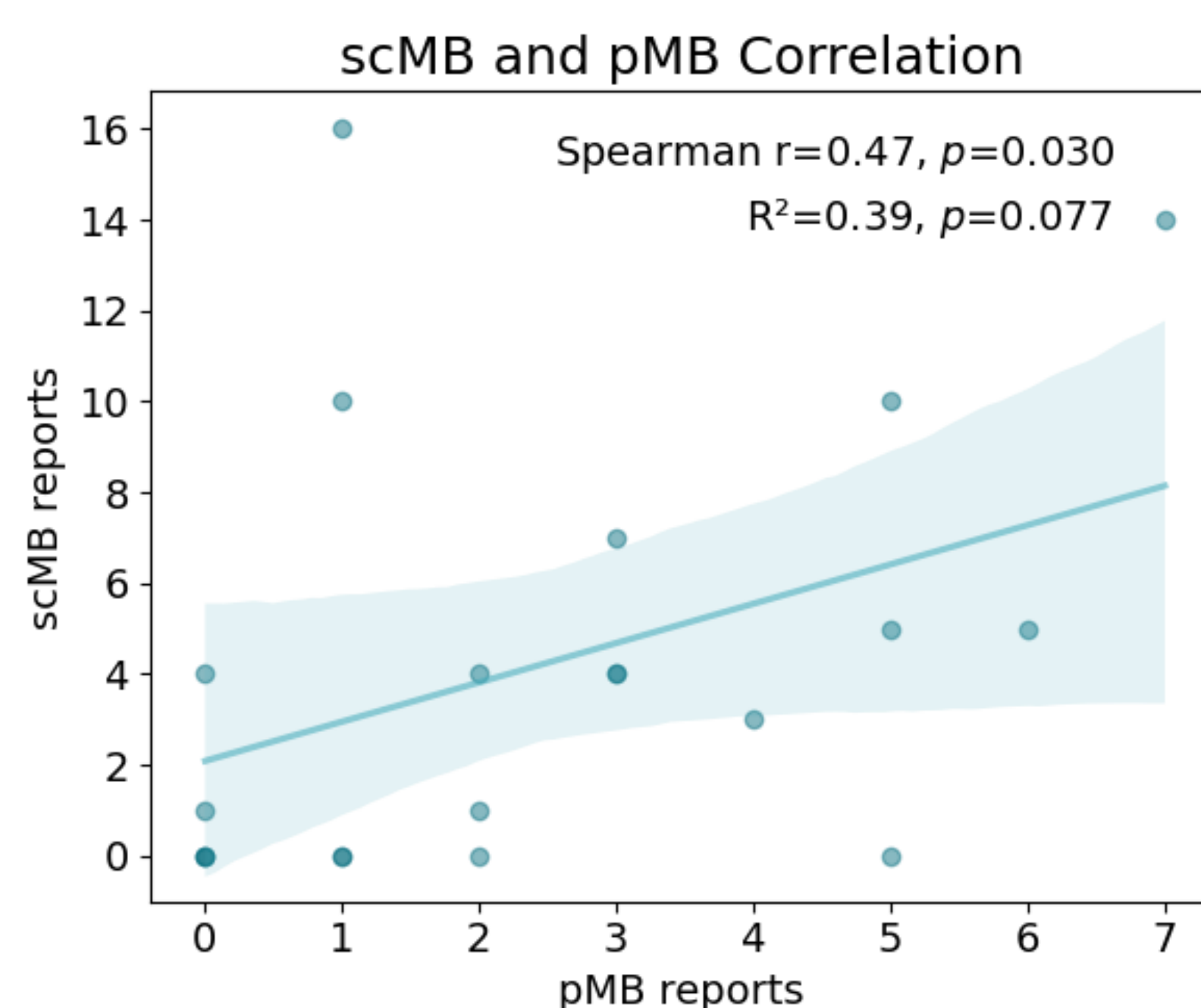
Behavior
- Correlation between number of reports per condition
- Distribution of reports across time (χ^2 vs uniform)

Brain
- **Condition Specific**: FC distance to their cluster & analog cluster in other condition (Bayesian GLM with random effects, ROPE ± 0.4 SMD)
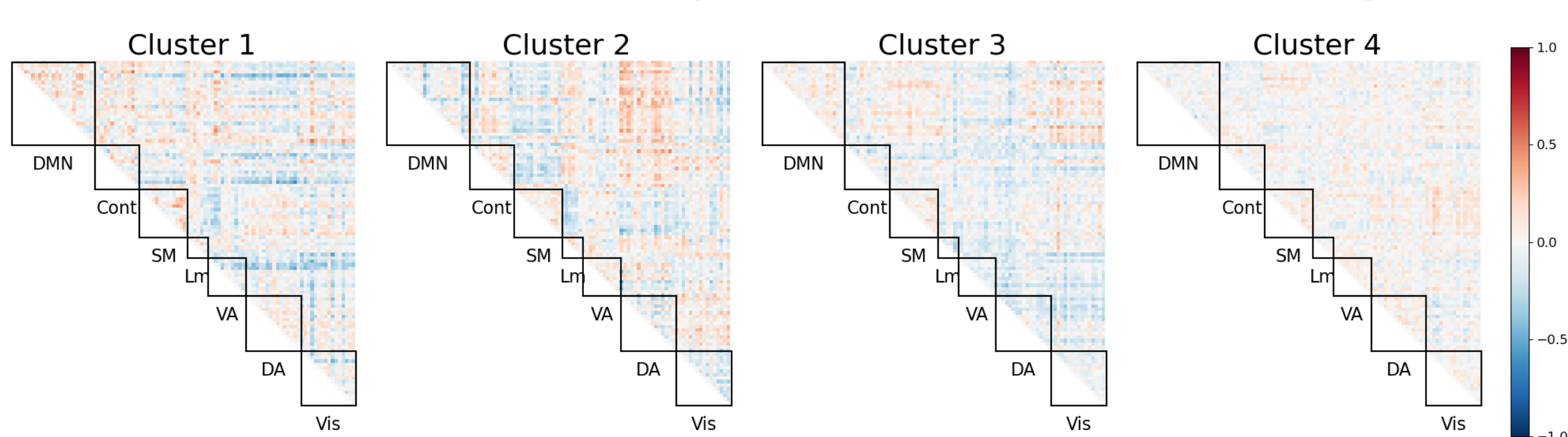- **Combined**: occurrence rate normalized by subject (paired t-test, p-FDR < 0.05)

Results

scMB and pMB correlated positively, and both type of reports distributed uniformly over time

Behavior

scMB and pMB Correlation

Spearman r=0.47, p=0.030
R^2=0.39, p=0.077

scMB reports / pMB reports

scMB Reports Distribution

$\chi^2 = 7.45$, p = 0.590, $\varphi = 0.29$

pMB Report Distribution

$\chi^2 = 15.86$, p = 0.070, $\varphi = 0.56$
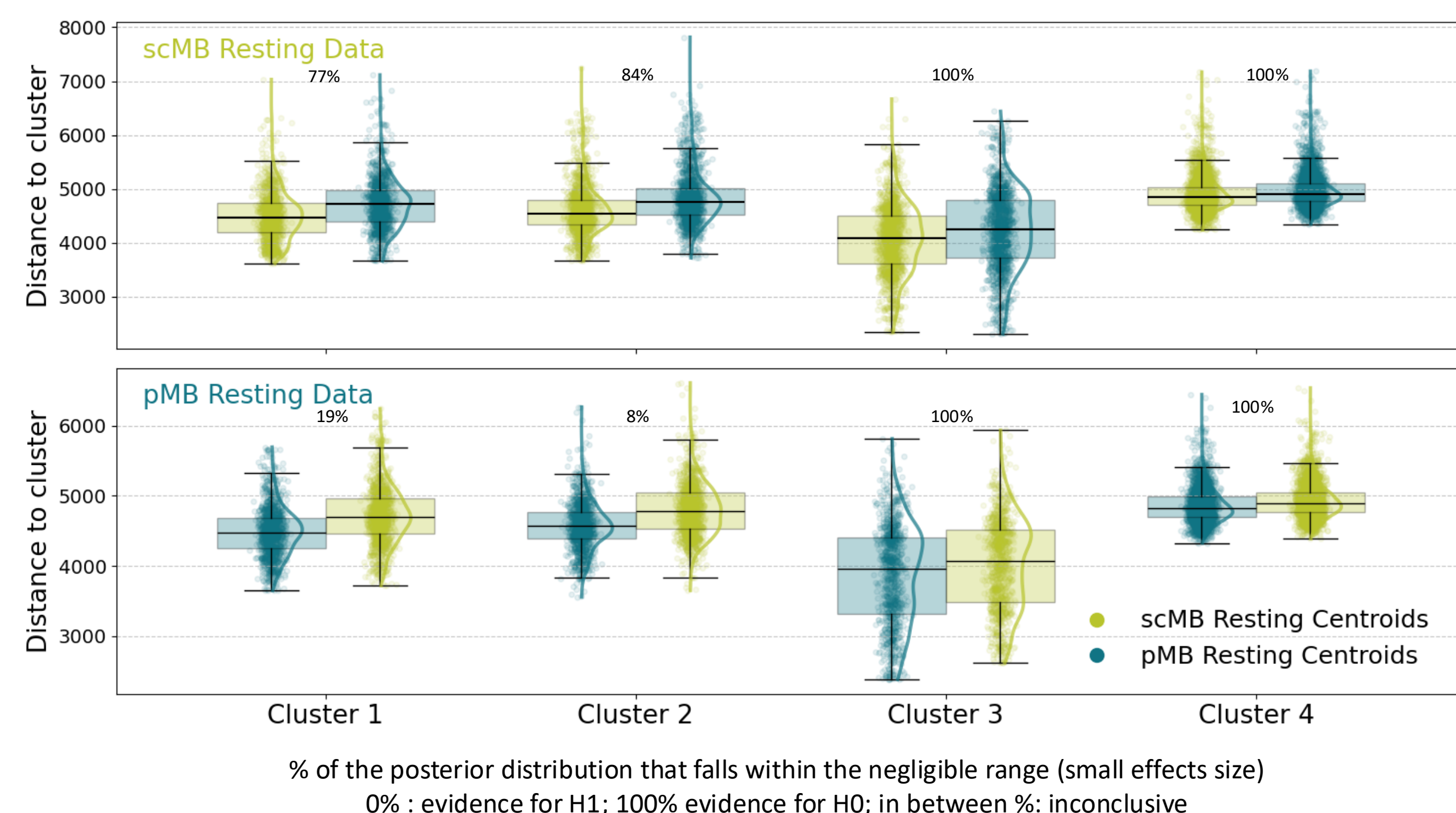
Time (minutes)

Brain

scMB and pMB clustering were equivalent in P3/P4 and inconclusive in P1/P2, with no clear difference

Comparison of conditions

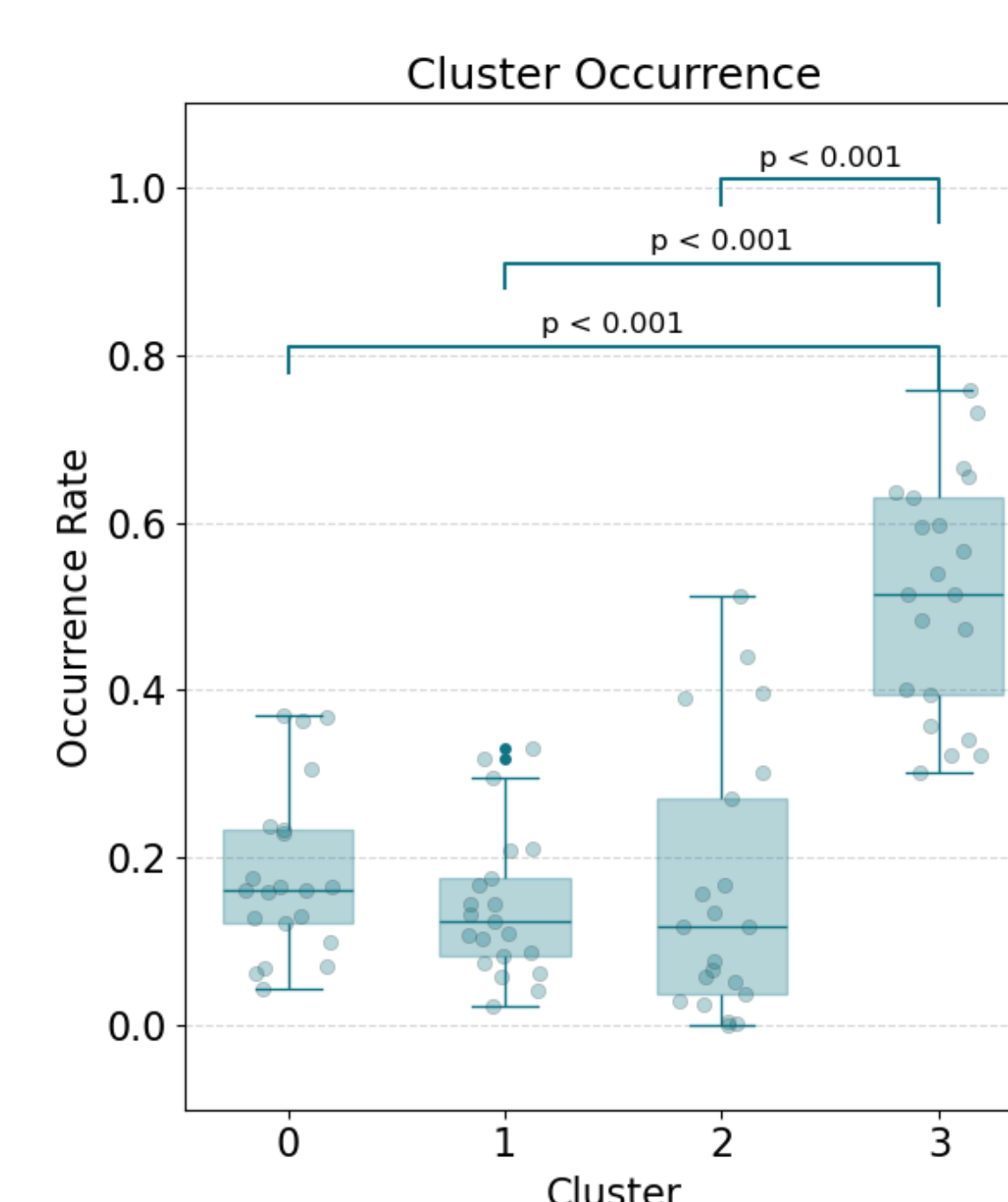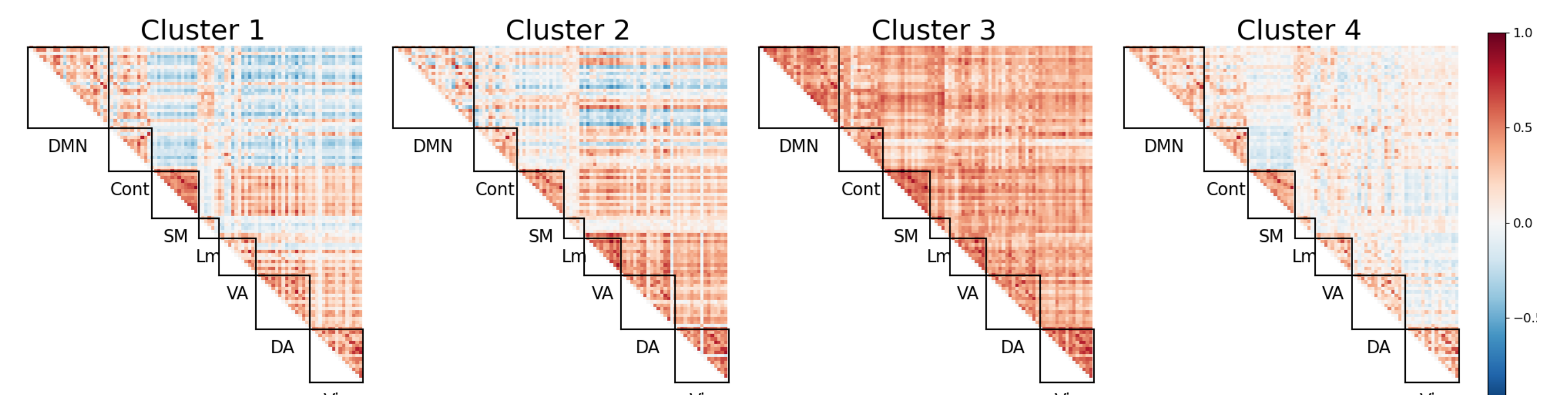Difference between scMB and pMB conditions Centroids (k=4, lag=0s)

Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4

Distance to Same-condition vs Other-condition Cluster

scMB Resting Data — 77%, 84%, 100%, 100%

pMB Resting Data — 19%, 8%, 100%, 100%

Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4

scMB Resting Centroids / pMB Resting Centroids

% of the posterior distribution that falls within the negligible range (small effects size)
0% : evidence for H1; 100% evidence for H0; in between %: inconclusive

FC patterns and their occurrence rate matched prior work

Combined conditions

Centroid Matrices for K-Means Clustering (k=4, lag=0s, data=all)

Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4

Cluster Occurrence

p < 0.001
p < 0.001
p < 0.001

Occurrence Rate / Cluster

Highlight

Self-caught methodology provides representative MB quantification comparable to probed MB, enabling alternative protocols.

References

[1] Boulakis & Demertzi, 2025. *Current Opinion in Behavioral Sciences.* Vol 61, 101481
[2] Andrillon et al., 2021, *Nature Communications,* Vol. 12, 3657
[3] Mortaheb et al., 2022. *Proceedings of the National Academy of Sciences,* Vol. 119, e2200511119

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