

Global brain dynamics under visual entrainment

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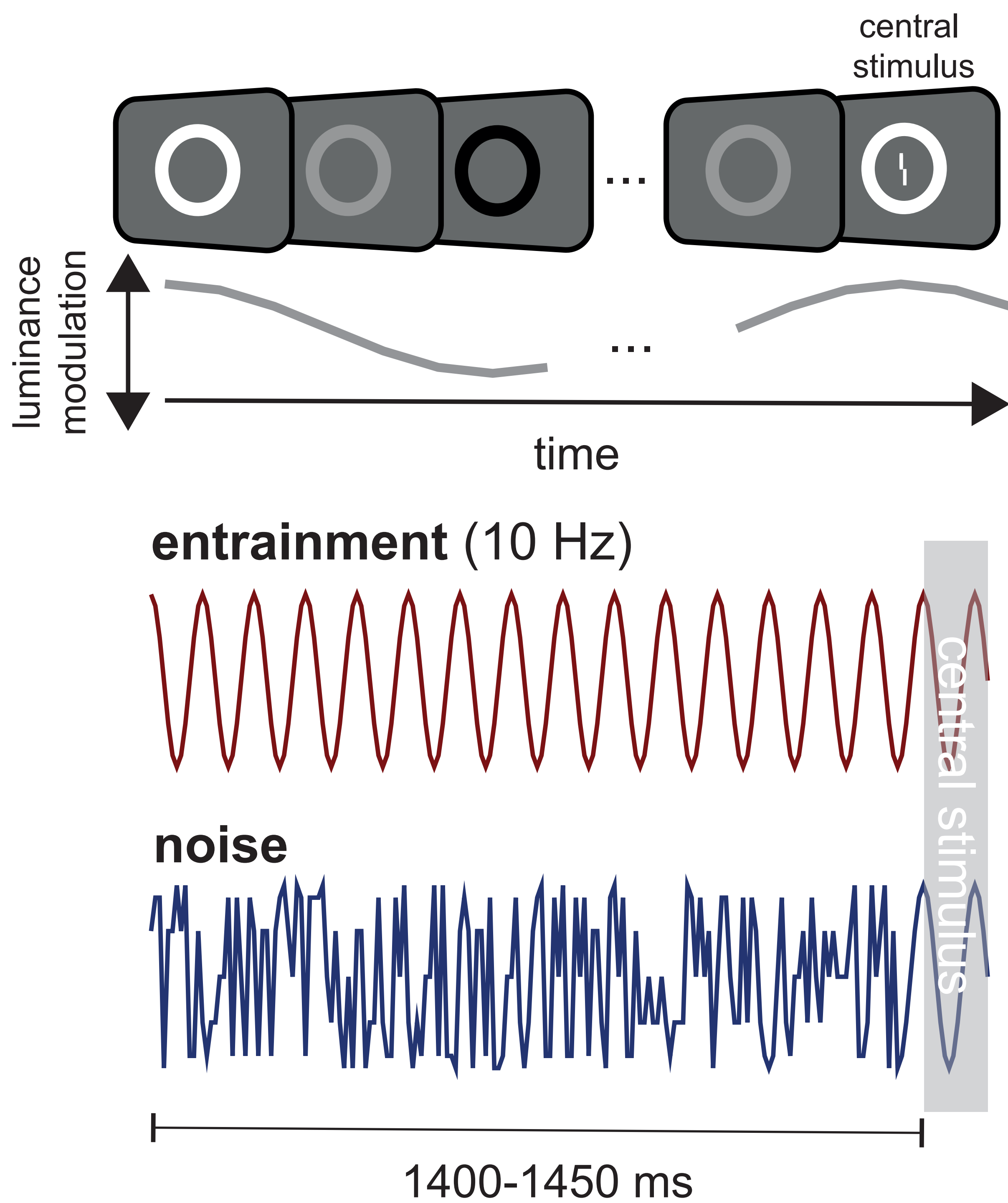
Question

In visual entrainment (VE)¹, an external rhythm (e.g., a flickering light) drives oscillations in the brain. VE has been widely used in the study of perceptual and cognitive rhythms.

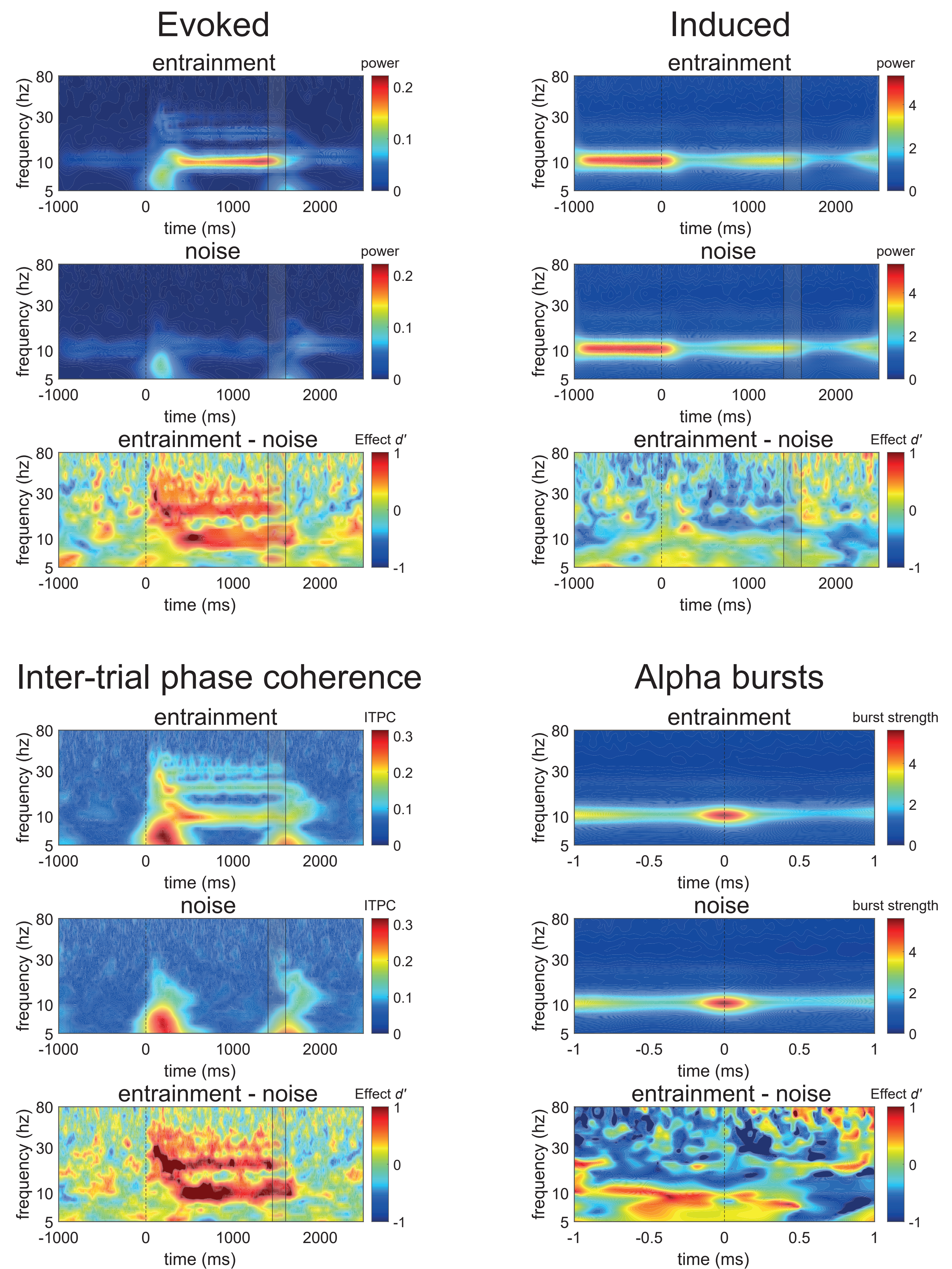
But what are the actual changes in brain dynamics that occur during the mutual resonance with an external source?^{2,3}

Methods

A luminance modulation at 10 Hz entrains activity at 10 Hz. Noisy luminance patterns do not entrain 10 Hz activity.

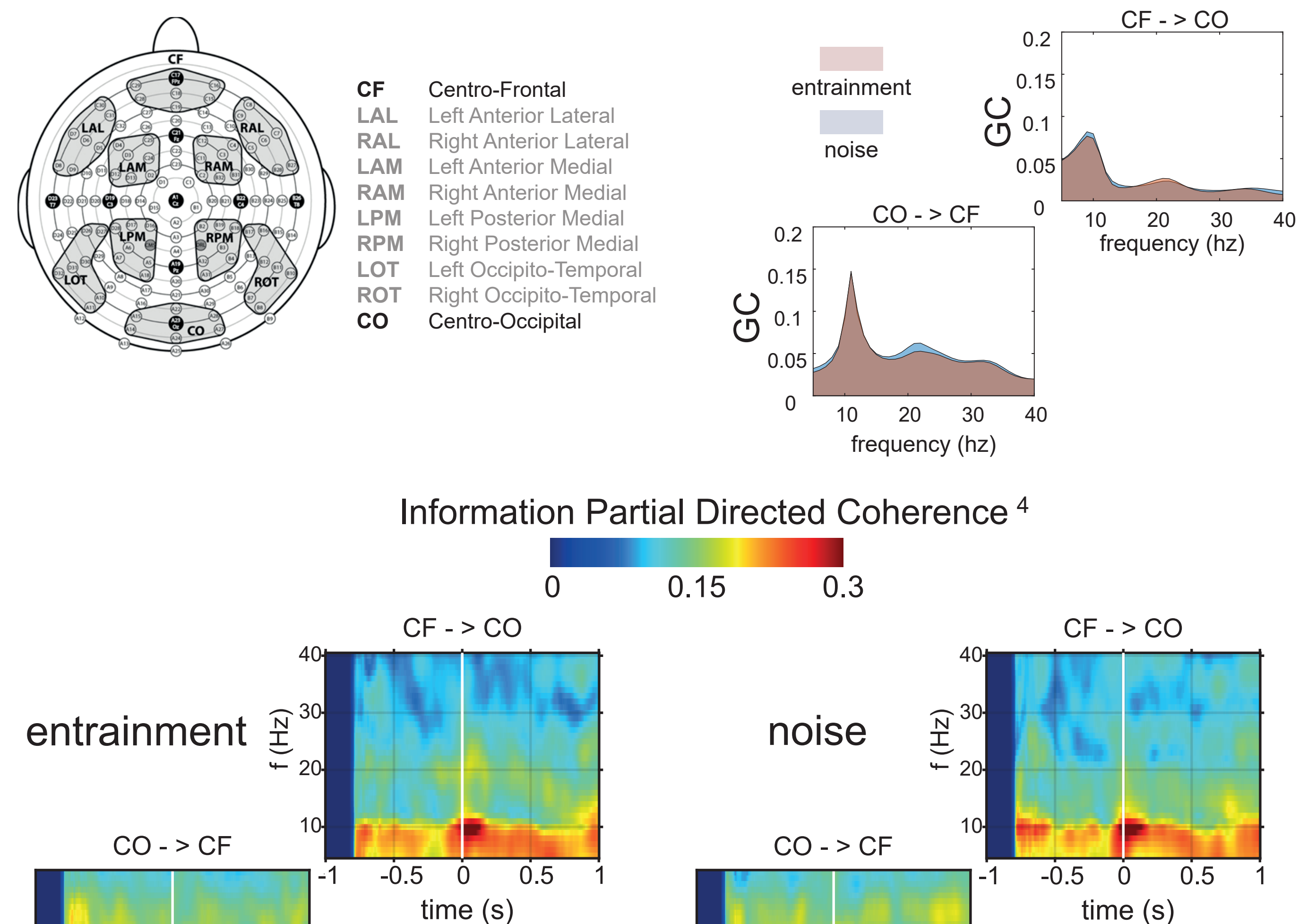


Time-frequency analysis

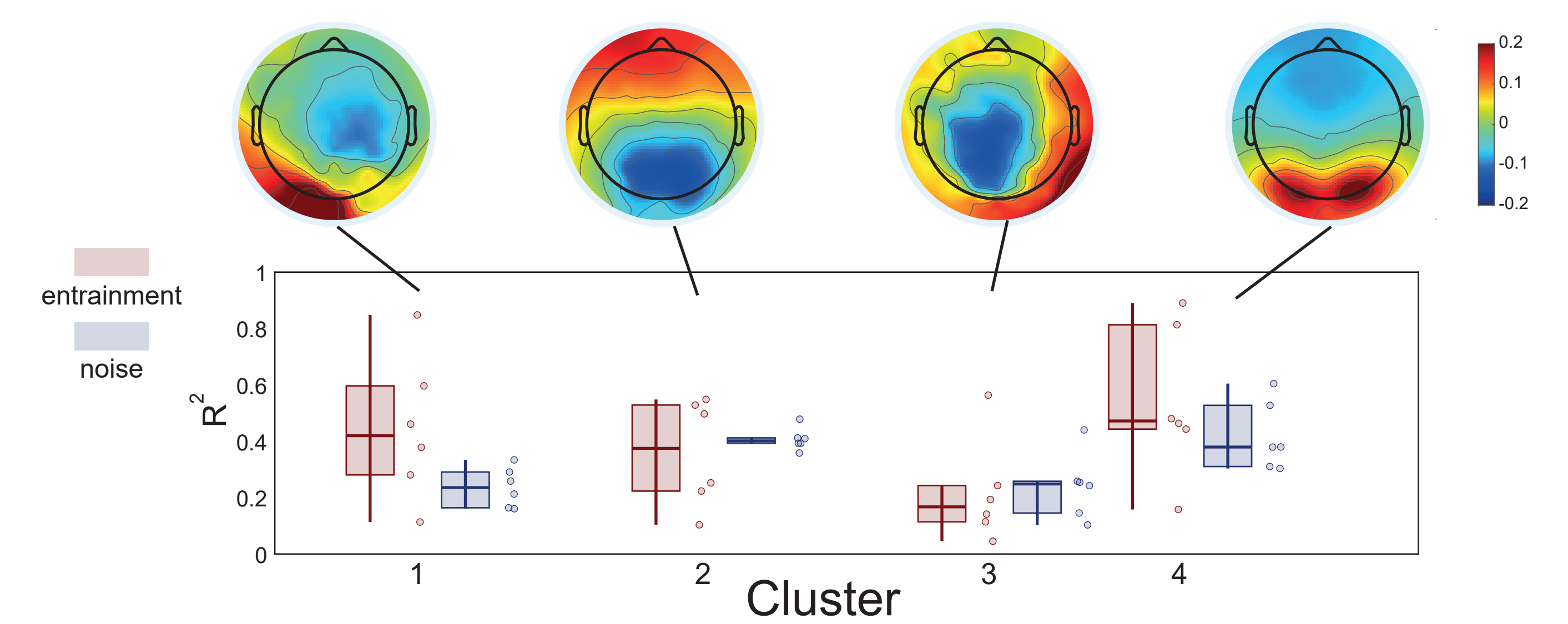


Long-range temporal dependencies

time-locked to α bursts (peak)



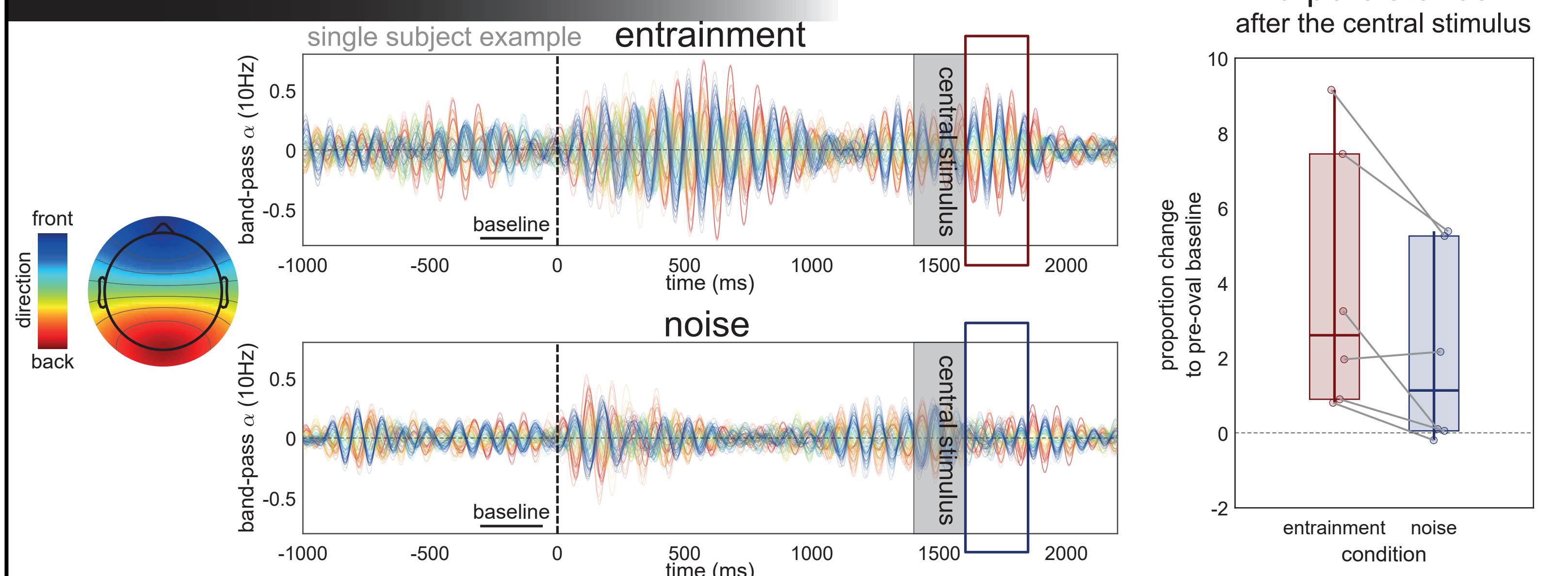
α -band activity clustering



Conclusions

Our preliminary results (N = 6) suggests that:
 1) VE is evident mostly in evoked and phase-locked activity;
 2) no evident changes in large-scale directional influences;
 3) increase of alternating, sign-reversing α topographies;
 4) persistence after stimulus offset⁵ (α trails).

α trails



Refs. 1. Spaak, E., de Lange, F. P., & Jensen, O. (2014). J. Neurosci. 3. Zoefel, B., et al., (2018). Front. Neurosci.
 2. Lithari, C., et al., (2016). Brain Research. 4. Pascucci, D., Rubega, M., & Plomp, G., (2020). PloS Comput. Biol.
 5. Otero, M., et al., (2020). Front. Hum. Neurosci.