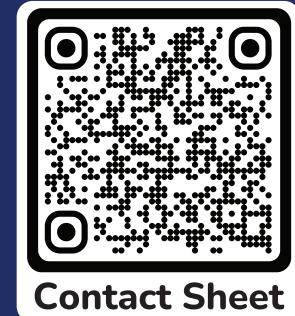


Working memory synchronizes oscillations in visual cortex

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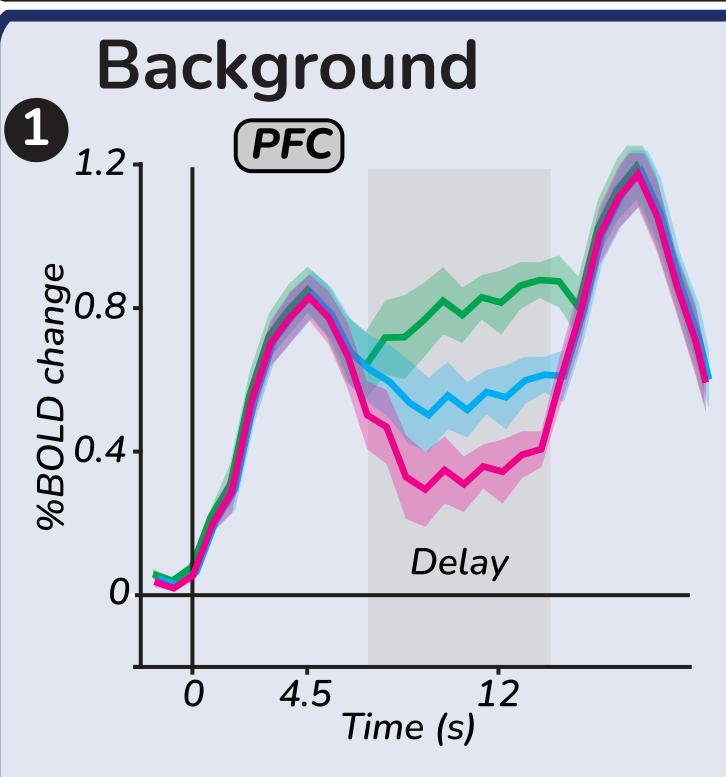


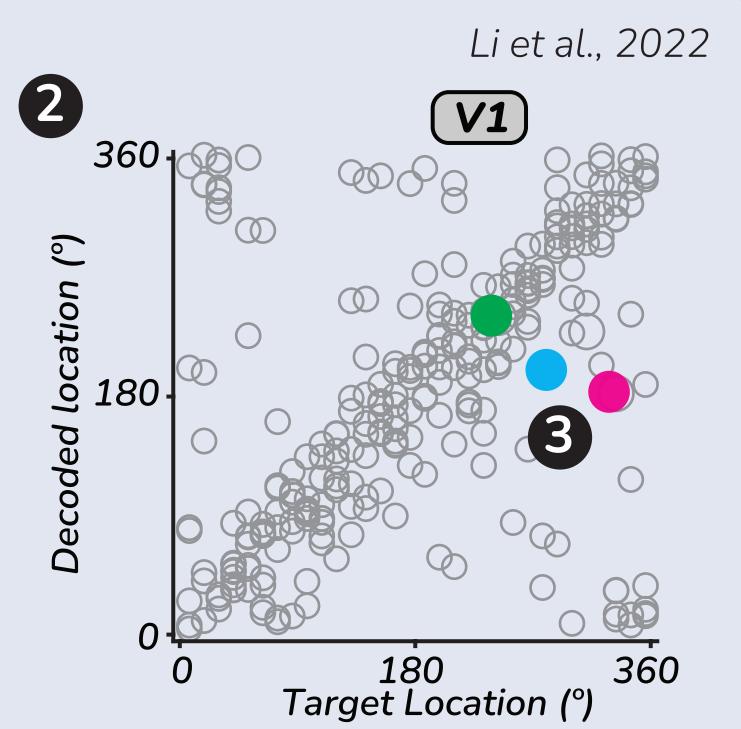


TL; DR

Oscillations in beta (\beta) band over visual cortex:

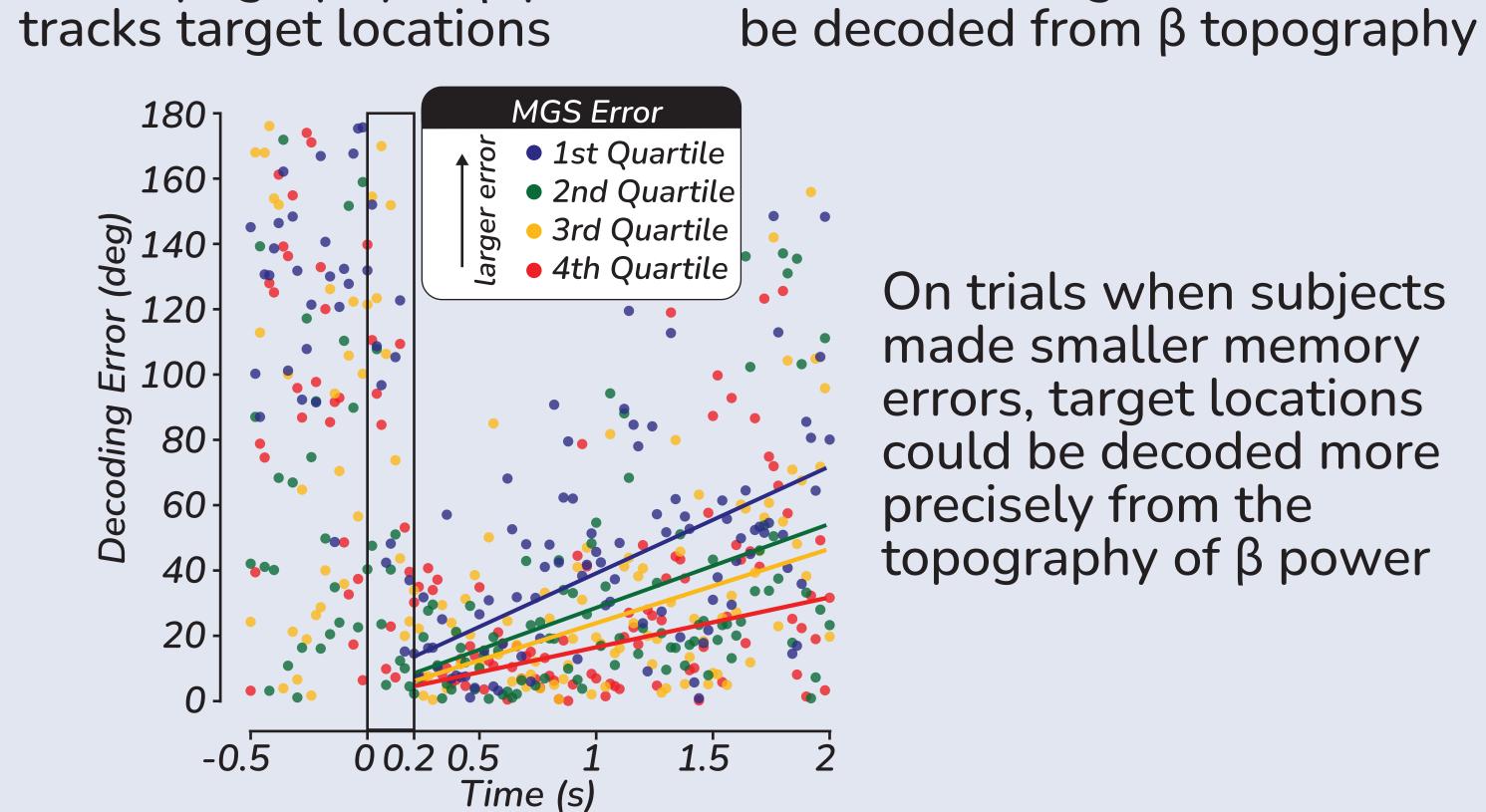
- Change in topographic patterns of power during WM delay
- Contain item-level specfic information about memoranda
- Predict trial-wise memory behavior
- Act as communication channel between PFC and VC





- 1 BOLD activity in PFC persists during WM delay periods
- 2 WM targets can precisely be decoded from activity patterns in V1
- Amplitude of persistent activity in PFC predicts accuracy of WM decoding from V1

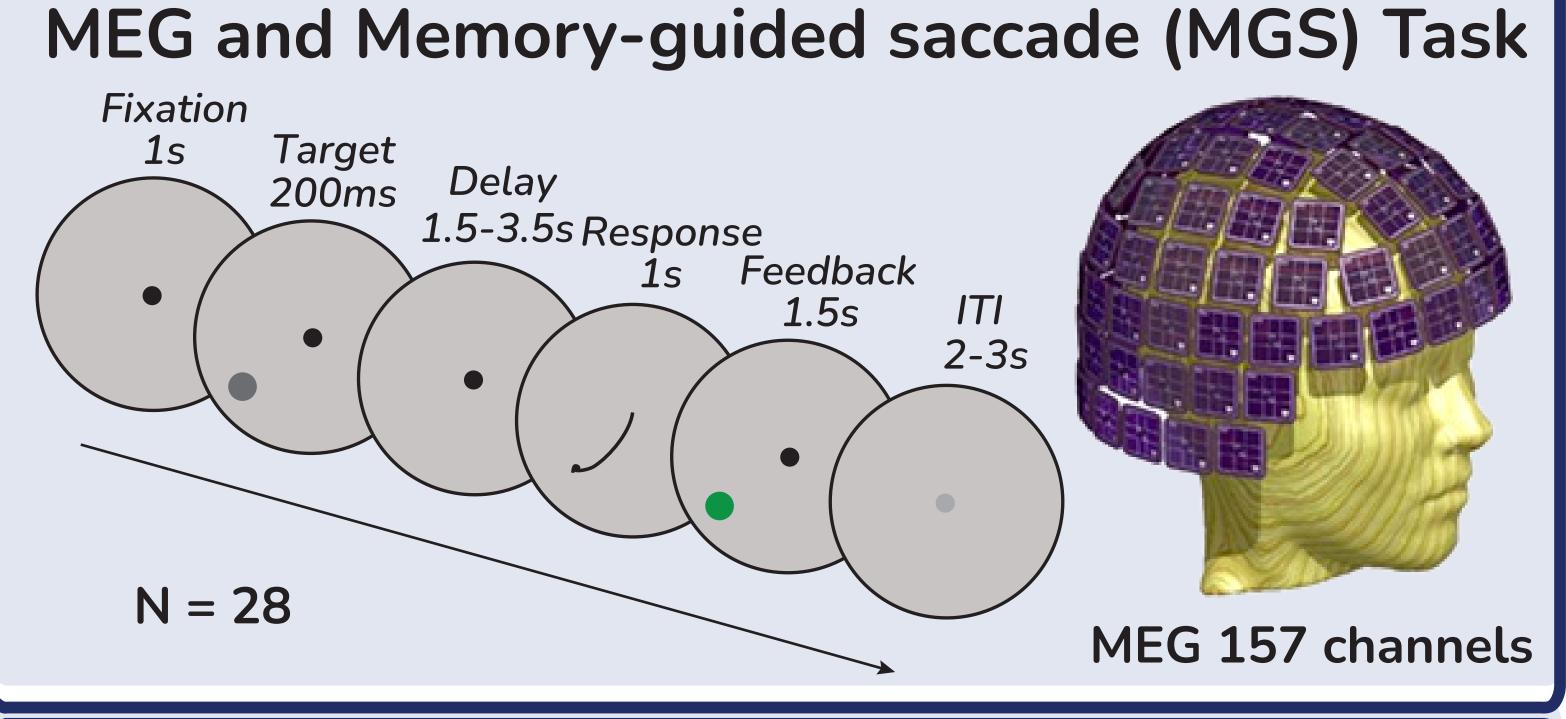
WM information encoded in \$\beta\$ topography Target Shuffled (ged) (ged) 山 100--0.04 -0.02 Rel. Power Time (s) Memorized target locations can The topography of β power



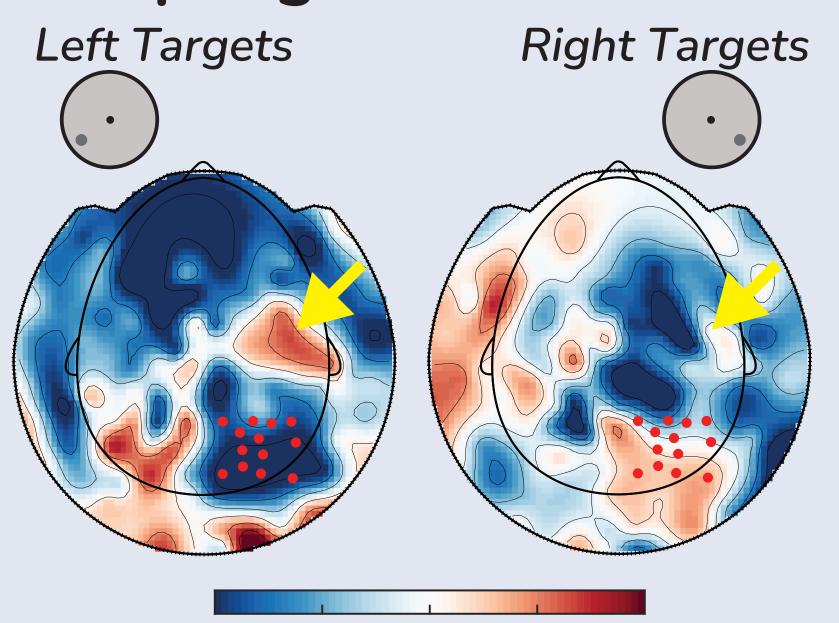
On trials when subjects made smaller memory errors, target locations could be decoded more precisely from the topography of β power

RESEARCH QUESTION:

By what mechanisms does PFC modulate V1 to help maintain precise stimulus-specific information in WM?



Coupling between V1 & PFC in \$\beta\$ band



$$C_{xy}(f) = \frac{|G_{xy}(f)|^2}{G_{xx}(f) G_{yy}(f)}$$

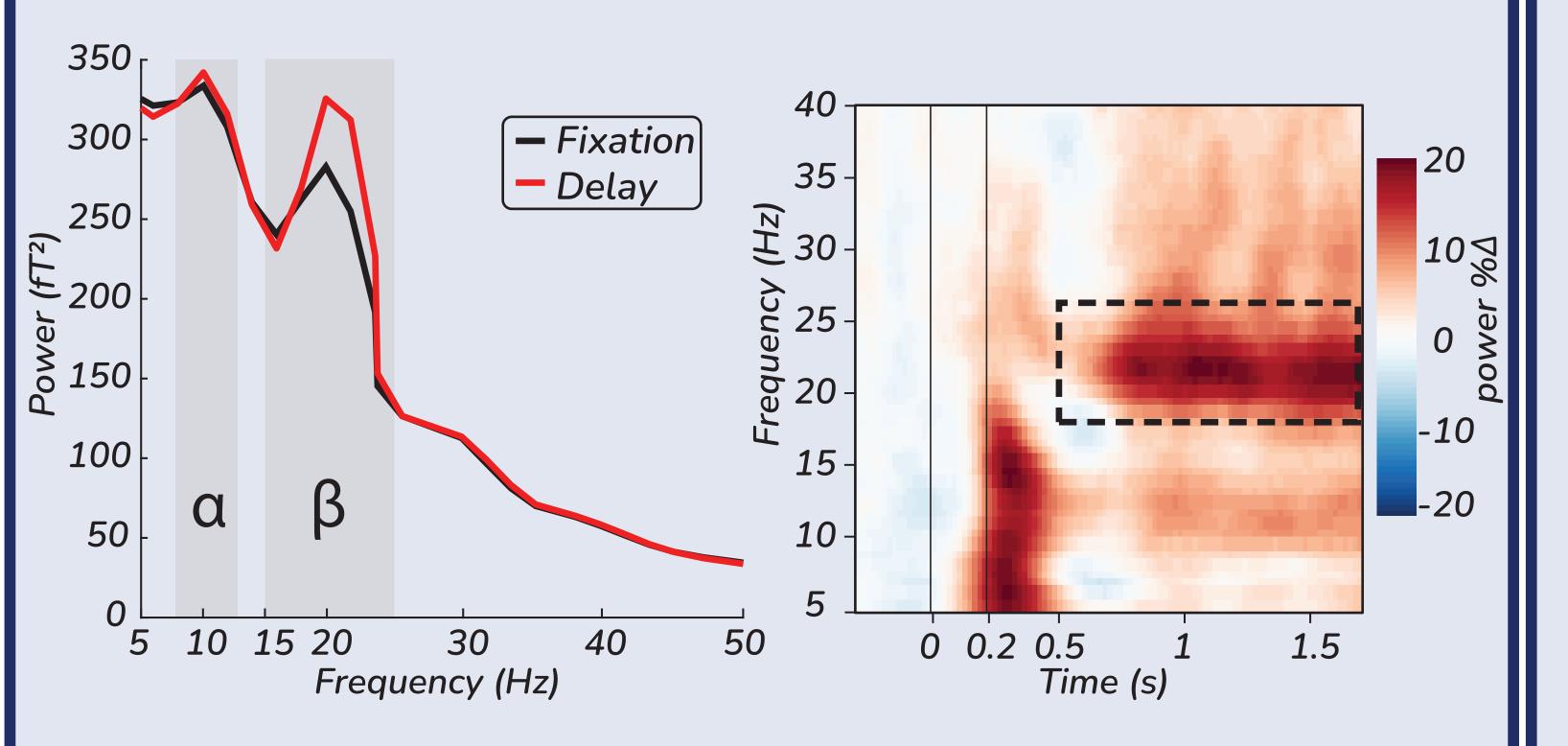
where, x(t) & y(t) are activity btwn sources G_{xy} is cross-spectral density & G_{xx} and G_{xy} are auto-sepctral densities

Noudoost et al., 2023

β-activity in seed sensors over occipital cortex (red dots) synchonizes with sensors over caudal PFC

Coupling is contralateralized with respect to the target and is within hemisphere

β power increases during WM delay



Sensors over occipital cortex show selective increase in β power during WM delay period

This increase in β power also persists during the delay

Summary and Conclusion

coherence (z-scored)

β-activity demonstrated several key hallmarks of WM (i.e, persistent activity, encodes stimulus info, predicts behavior)

Moreover, during the delay PFC activity synchronized with visual cortex in β-band

