

Some Simple Case Studies...



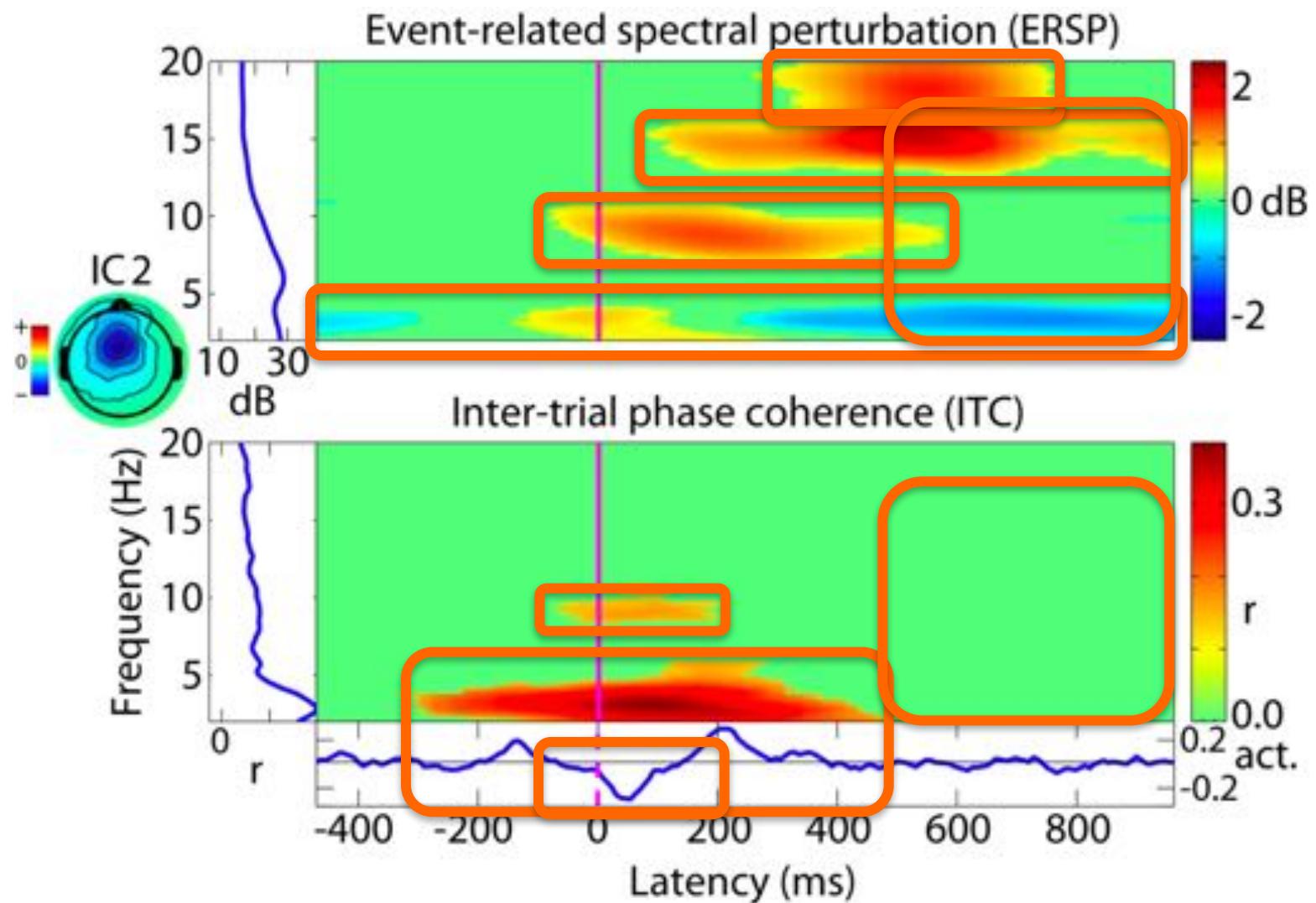
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Institute for Neural Computation
University of California San Diego

26th EEGLAB Workshop
Be'er Sheva, Israel
October, 2017

ERP

ITC

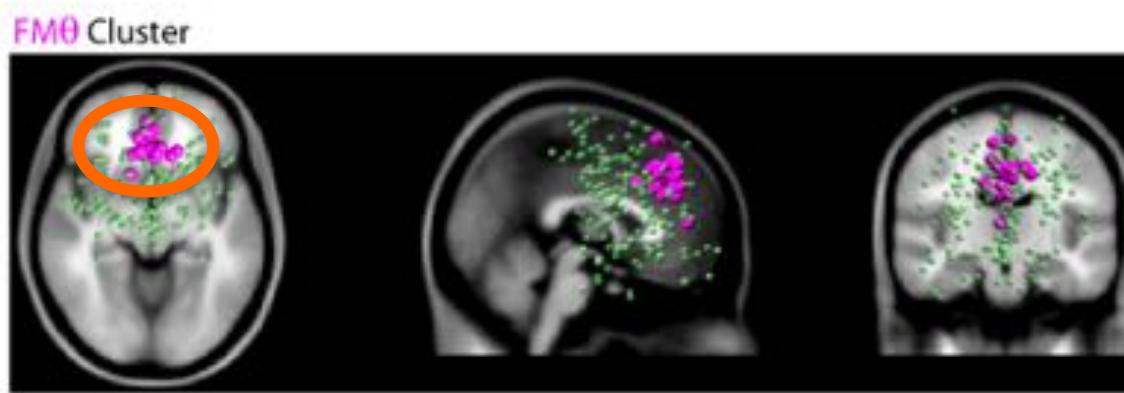
ERSP



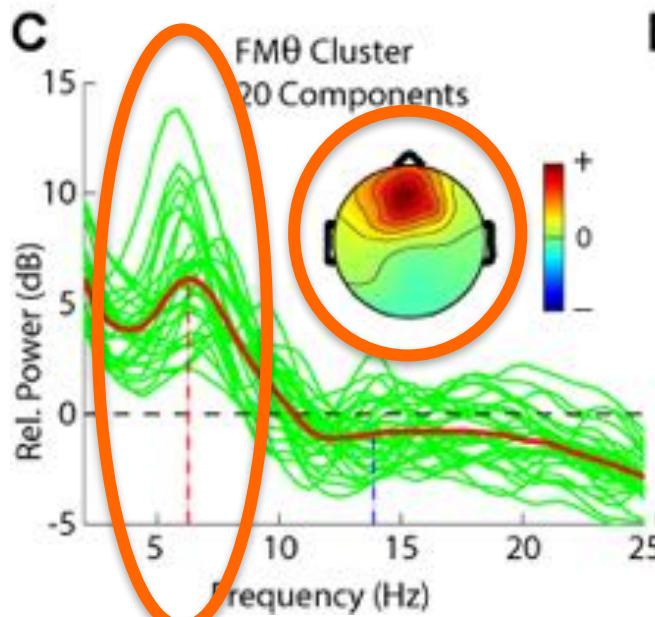
THETA

Example: frontal midline theta cluster

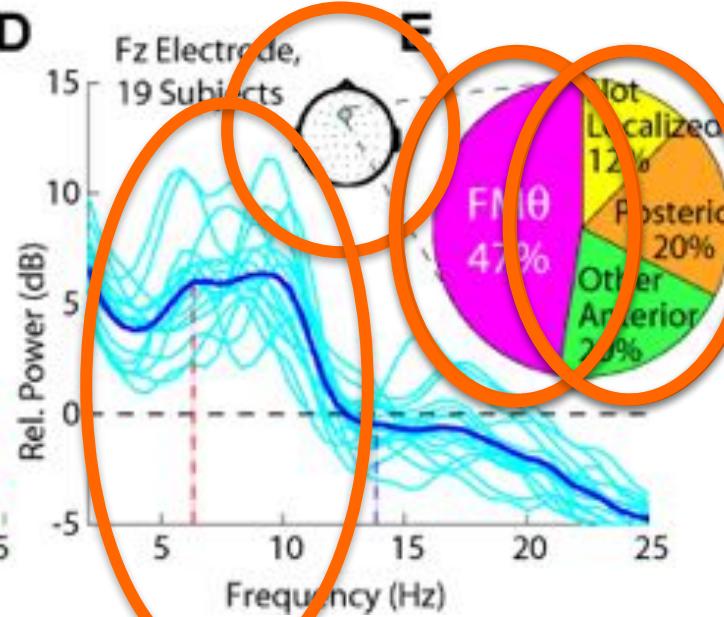
B



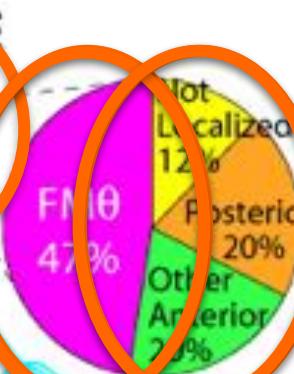
C



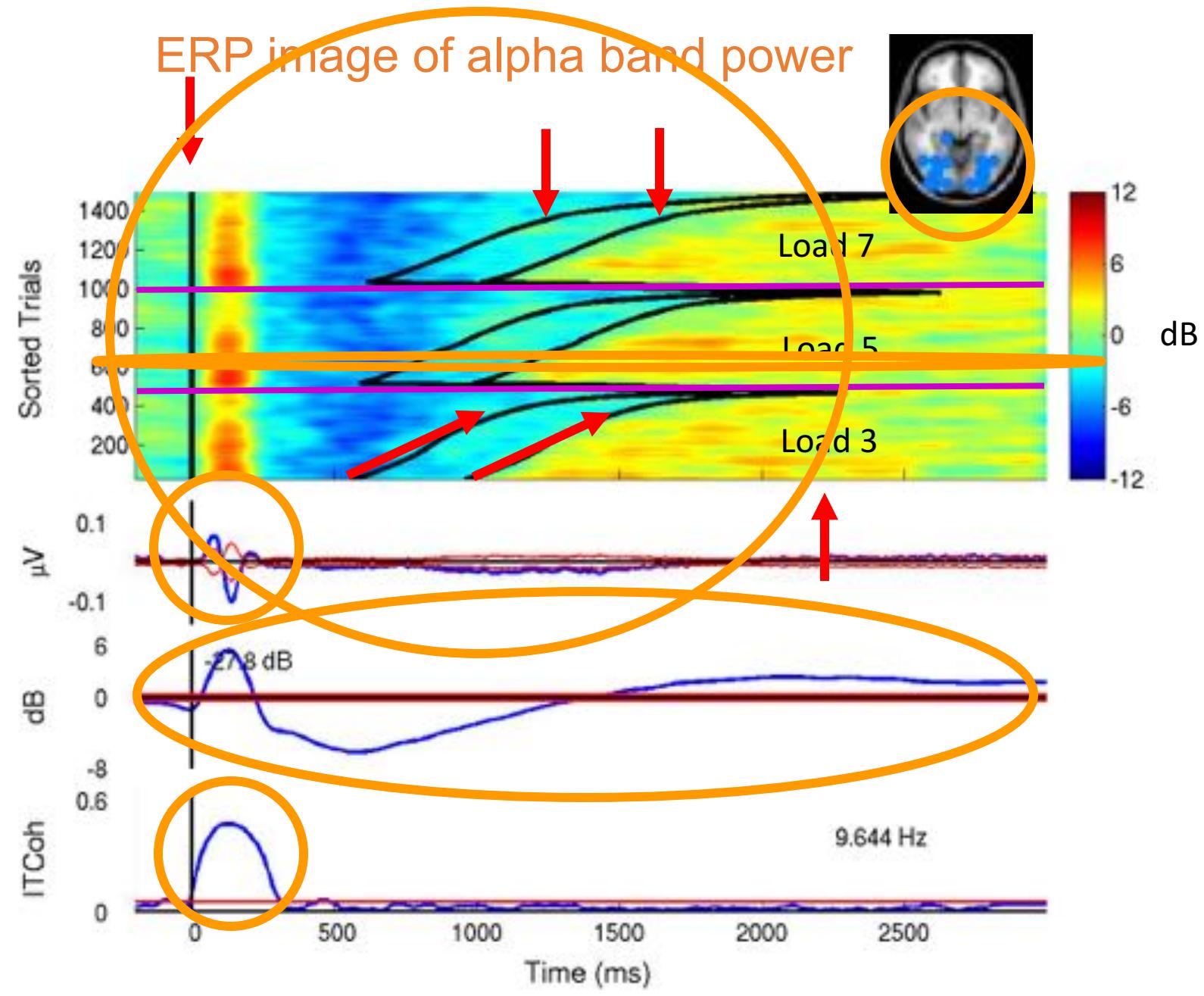
D



E



ALPHA

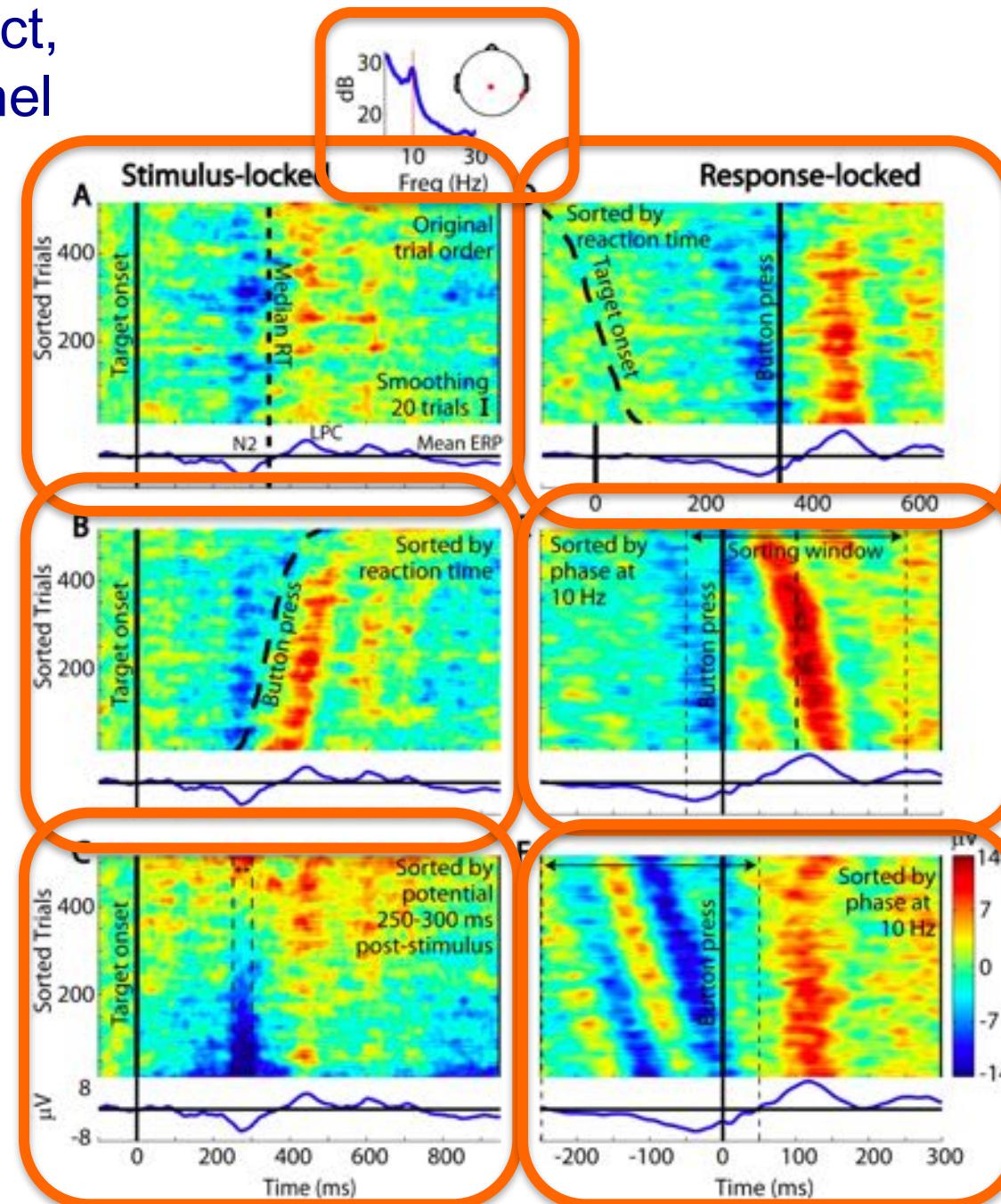


erpimage()

Onton, Delorme & Makeig, 2005.

Event Alignment

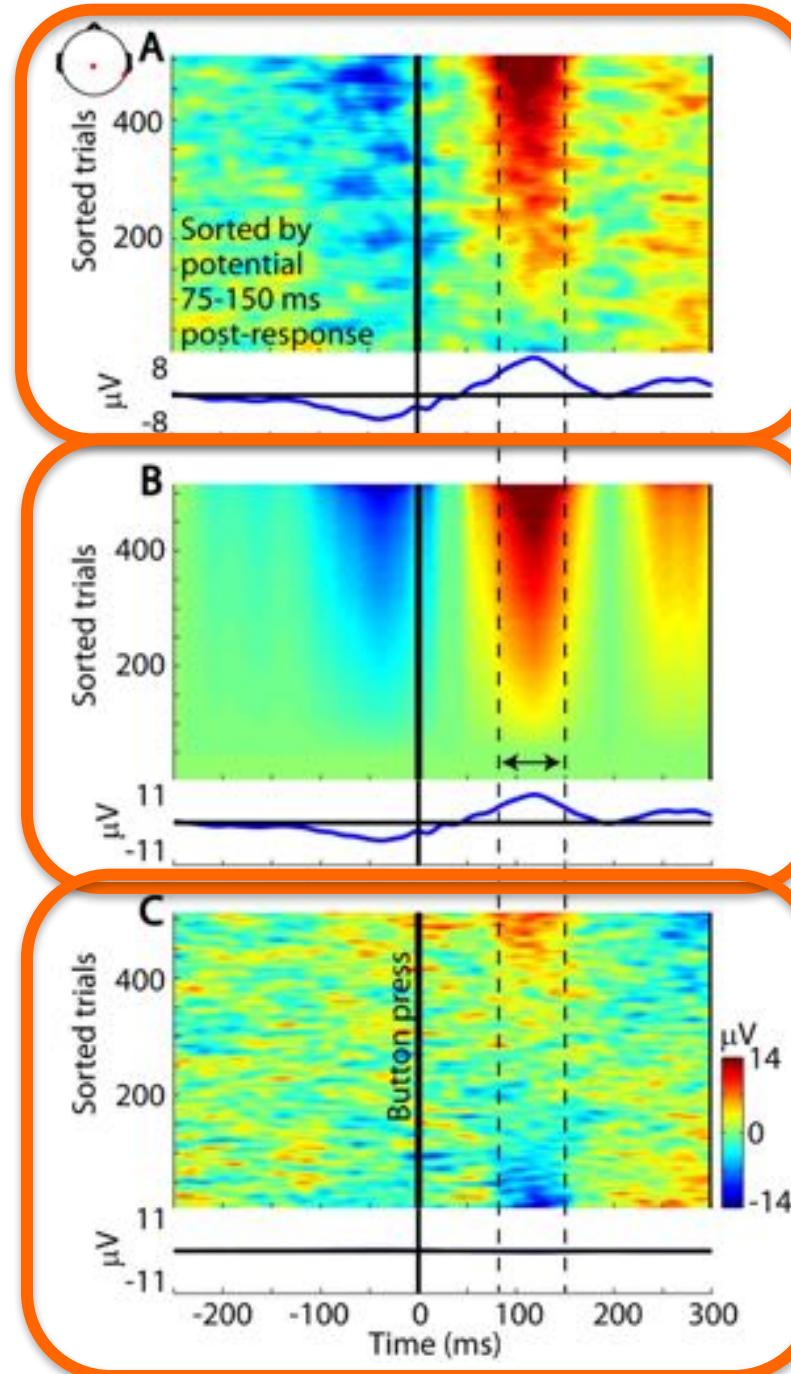
Single-subject, single-channel case study:



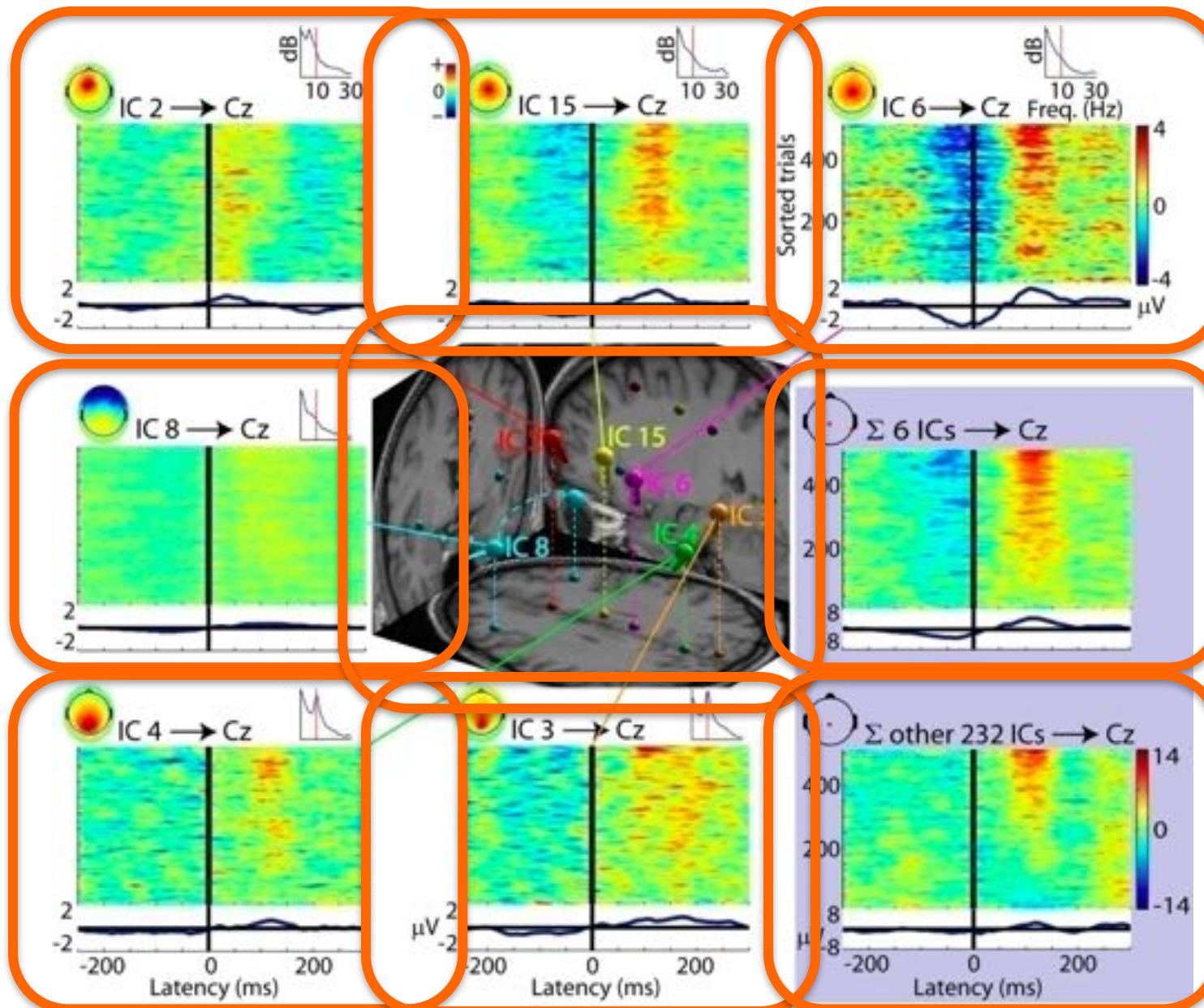
Single-subject, single-channel case study:

Regress out
the ERP from
each trial.

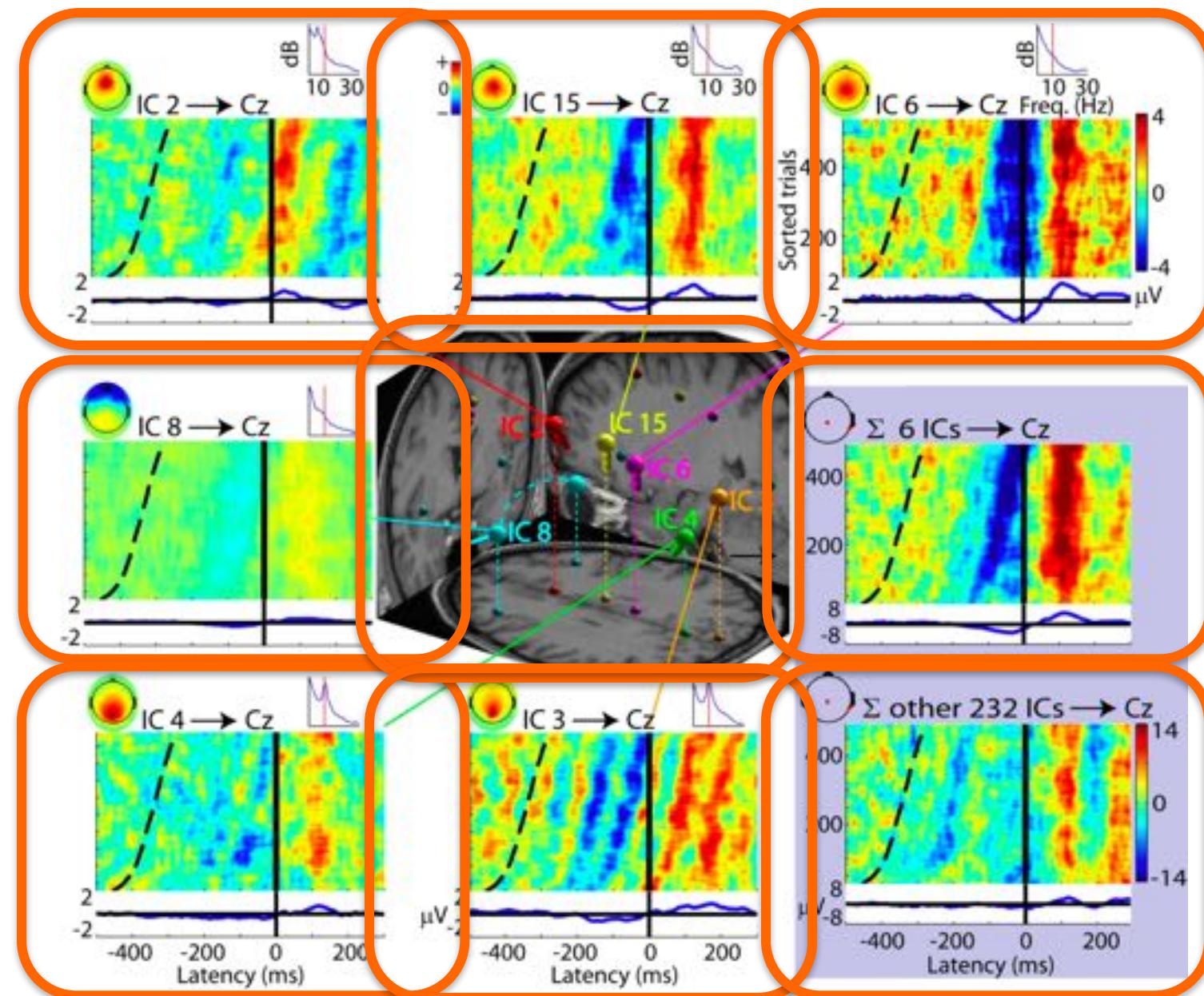
Remainder



Now, using ICA...



Now, viewing the ICs time-aligned to the button press...

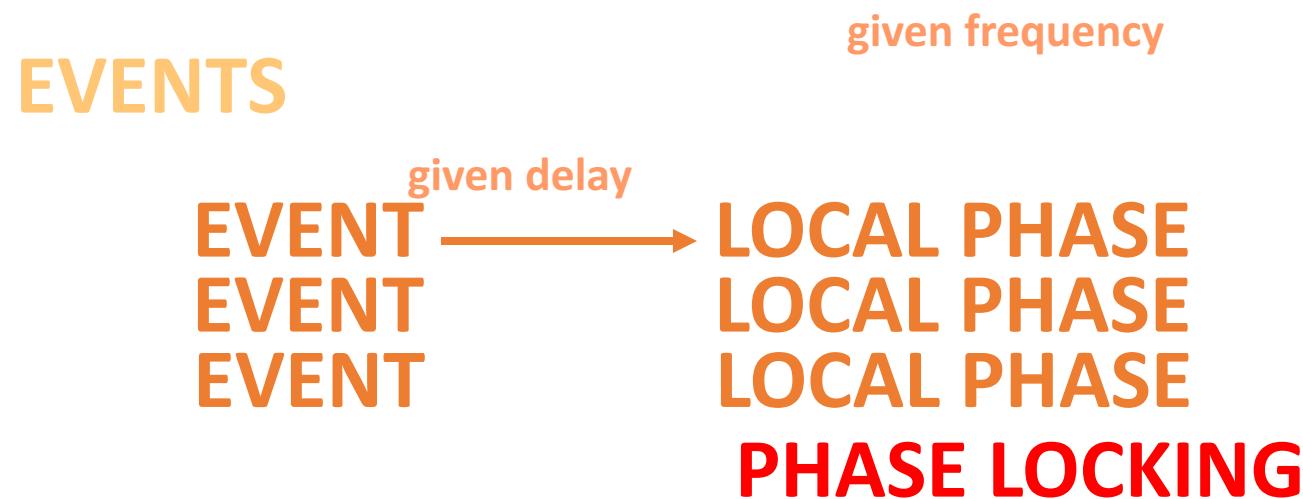


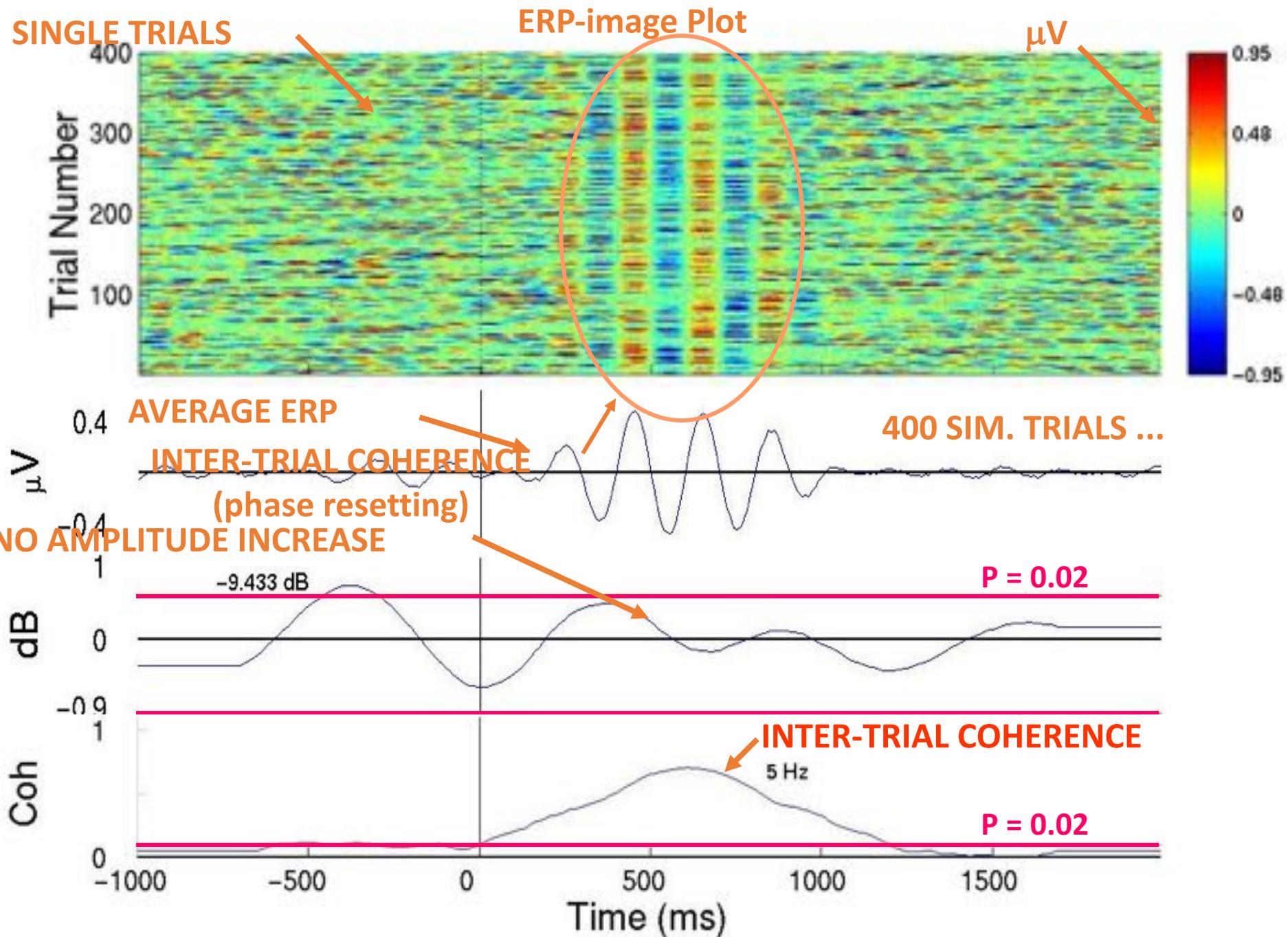
ITC

What produces event-related potential averages (ERPs)?

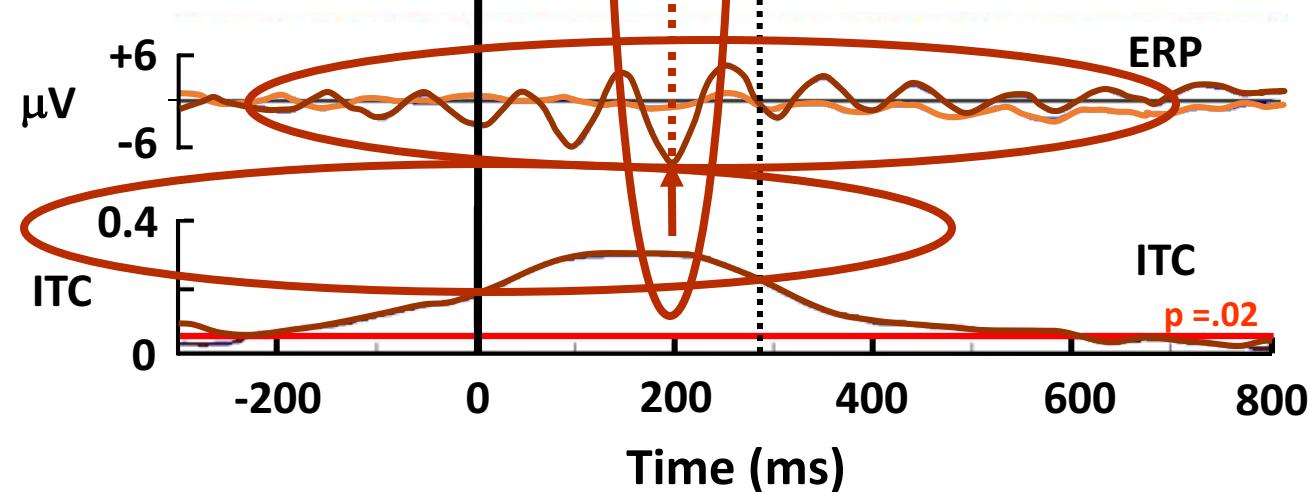
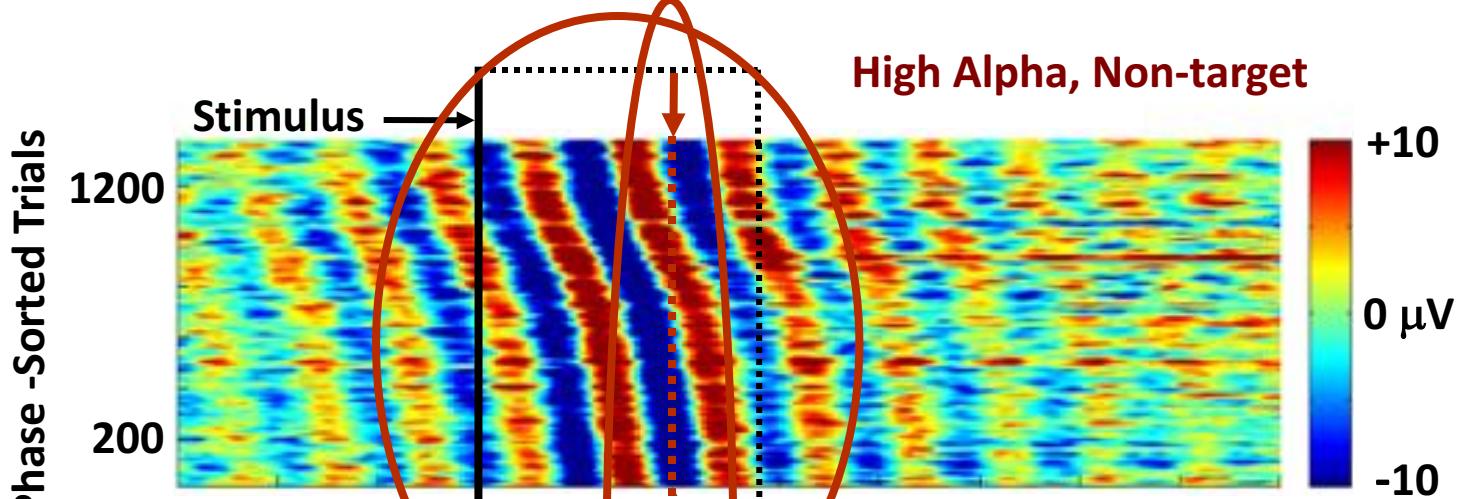
Inter-trial Coherence (ITC) (“phase-locking factor”)

- Significant **consistency of local phase** (relative to time-locking events) of a physiological waveform **across successive trials** ...

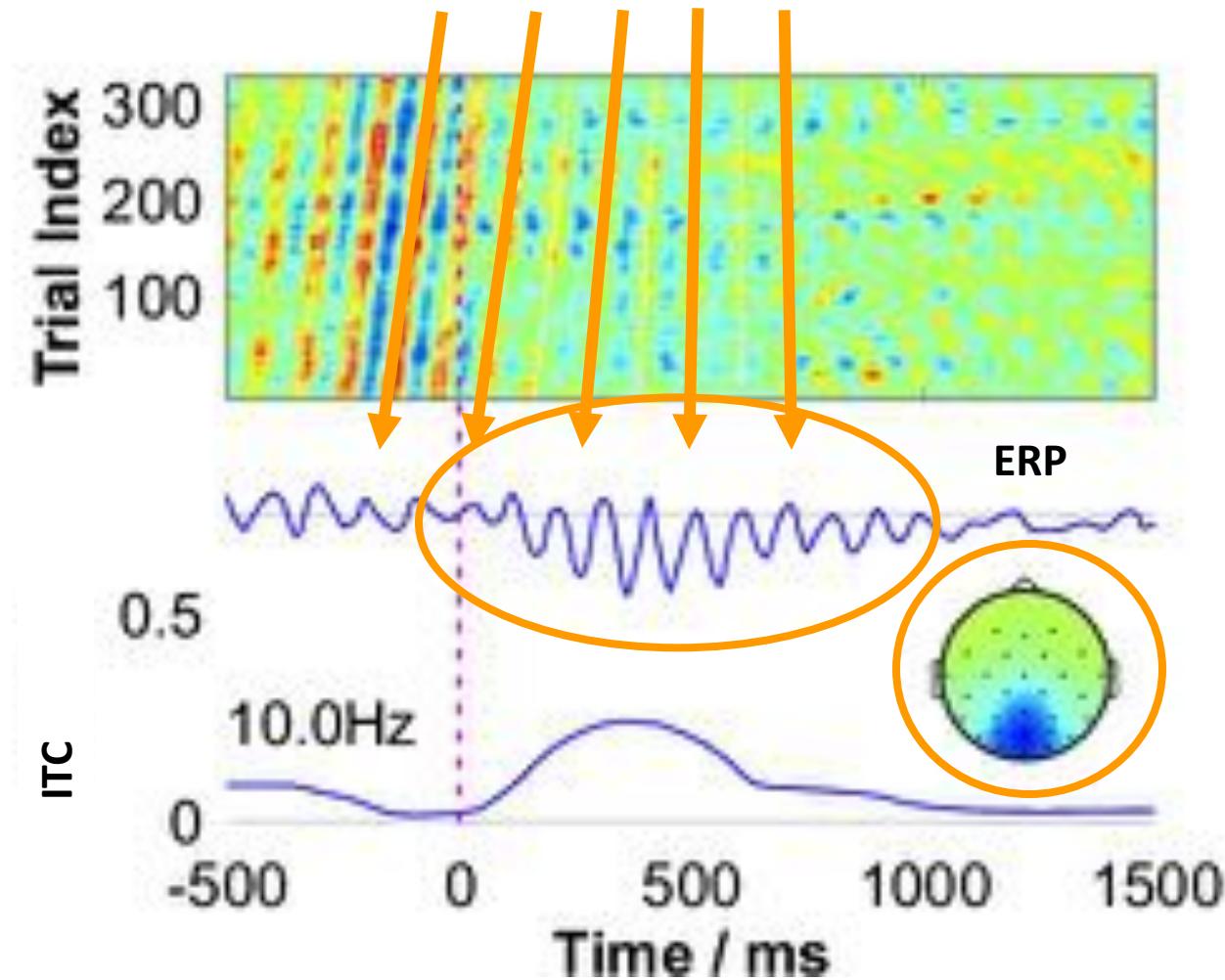


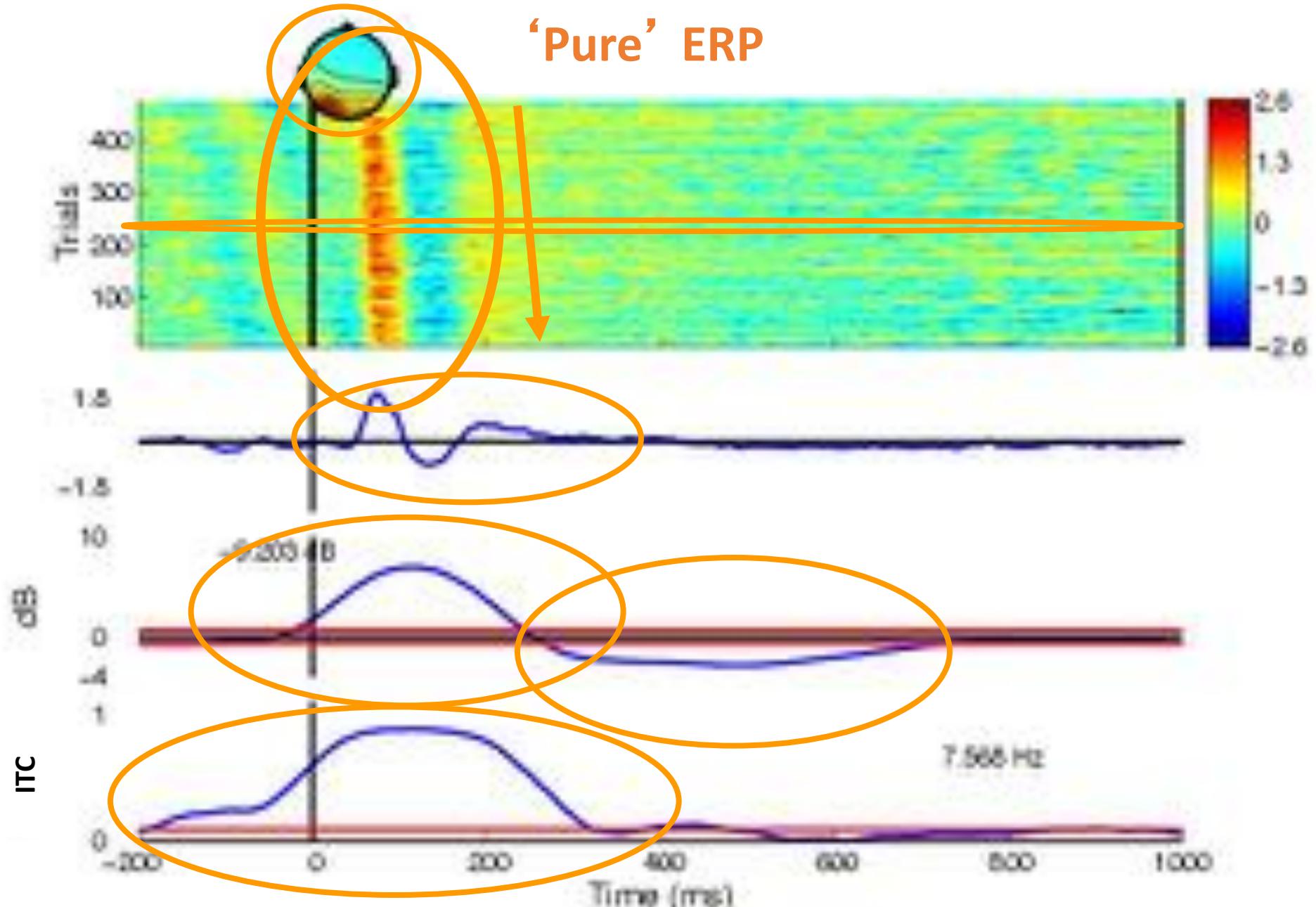


Phase Resetting



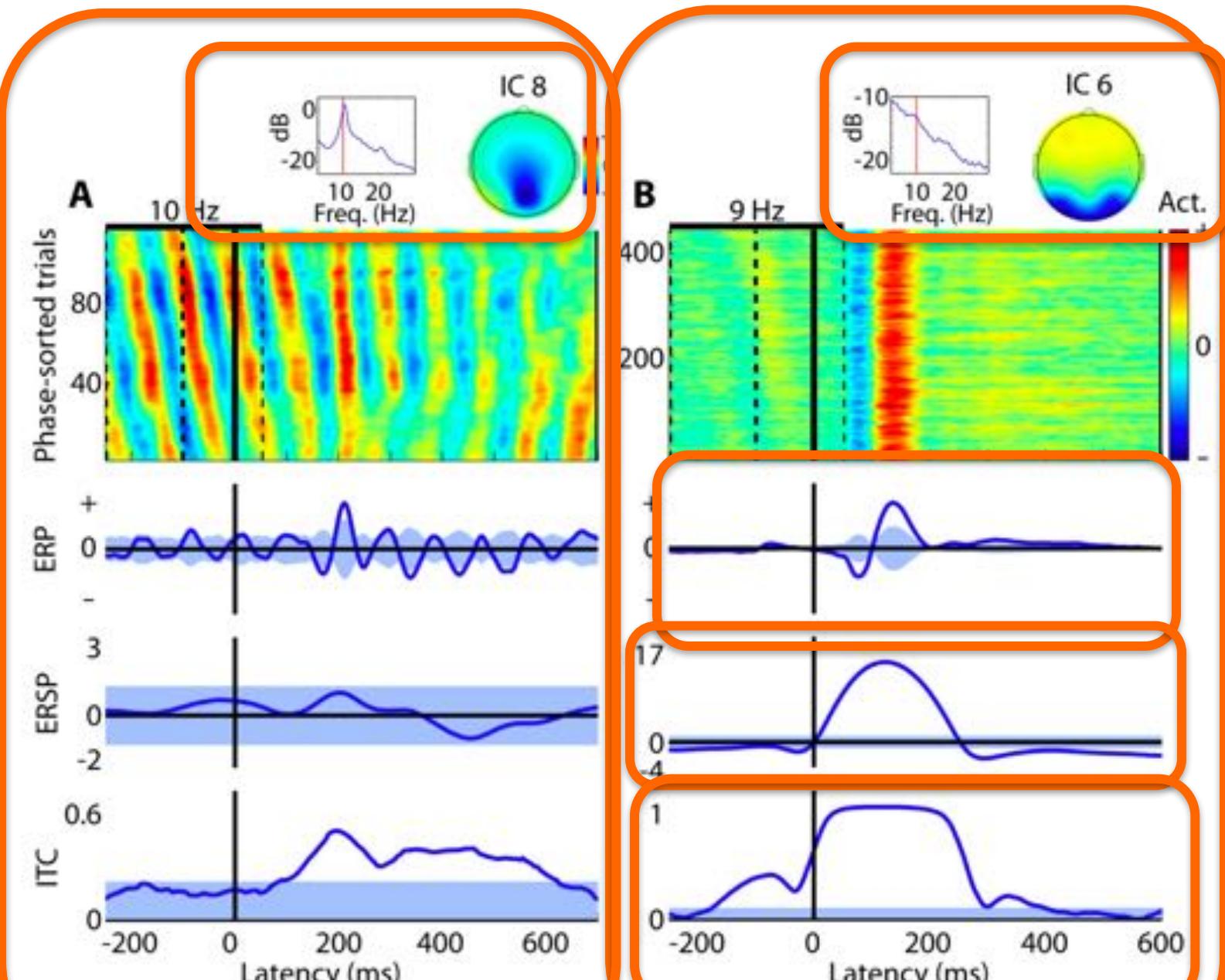
“True” PPR (visual ‘alpha ringing’)





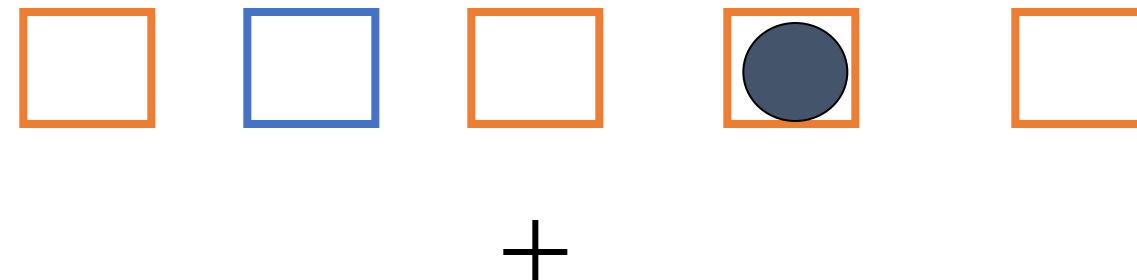
erpimage()

S. Makeig et al., TICS (2004))



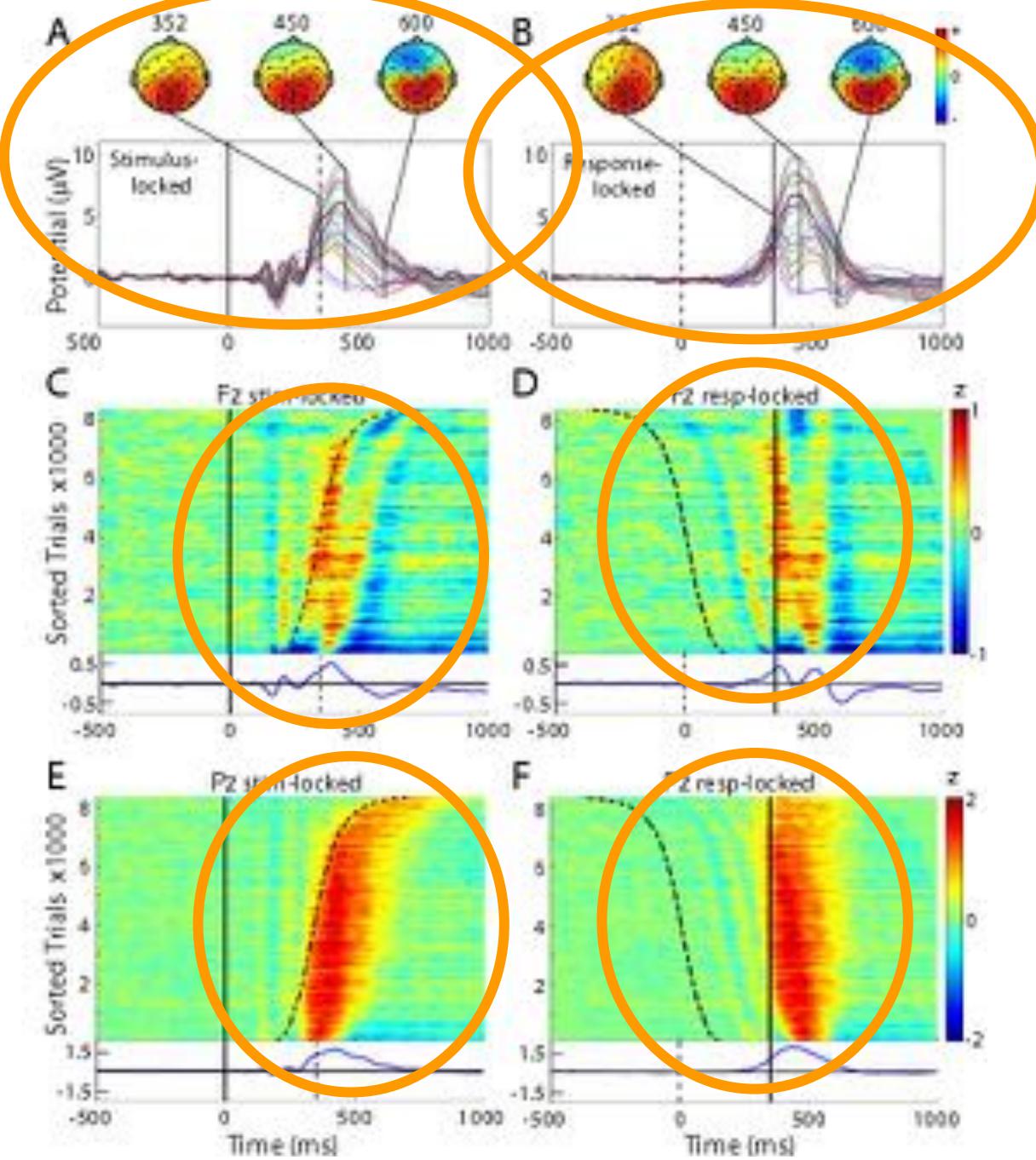
P3/LPC

Target ERP Responses

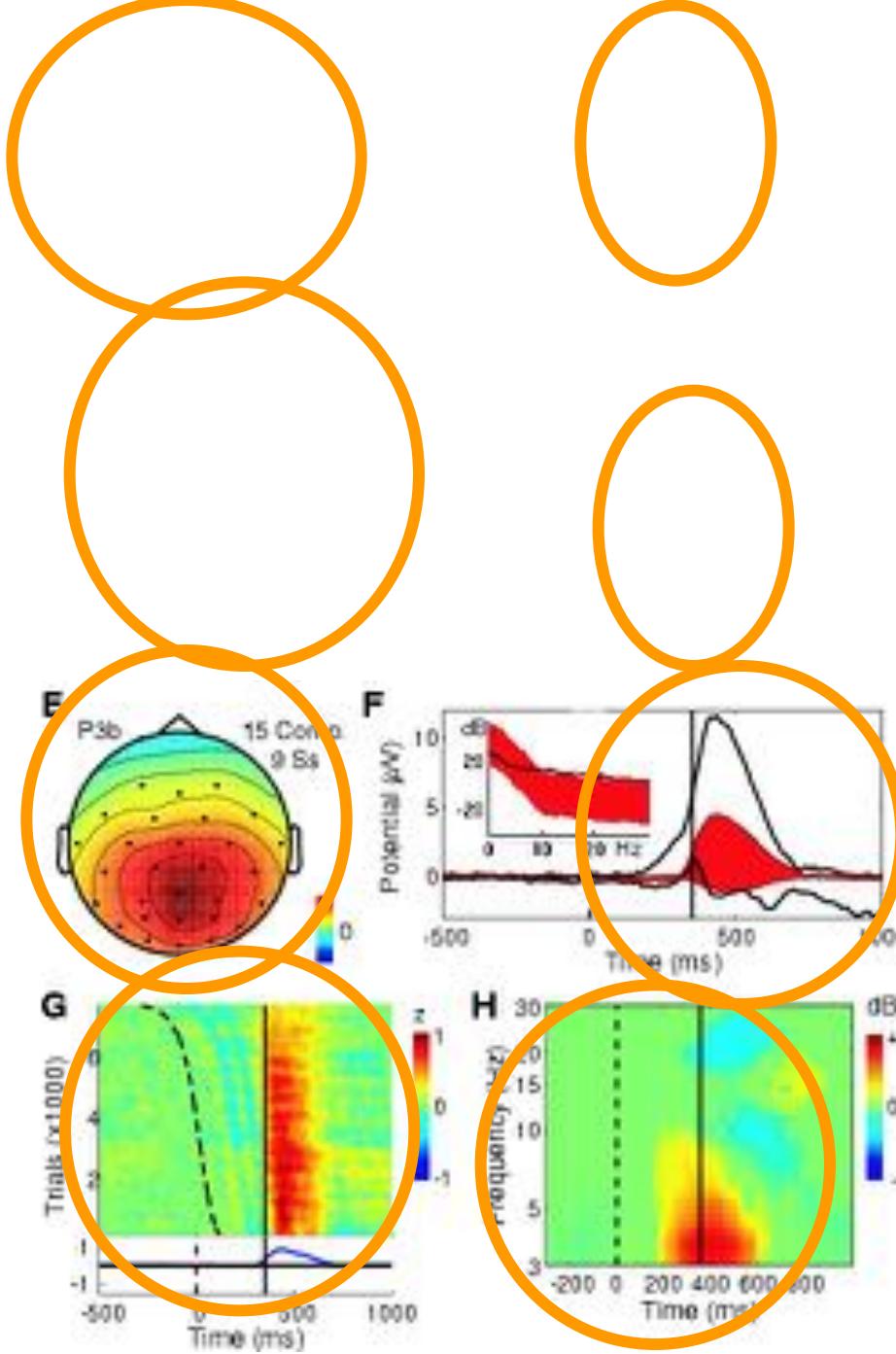


15 subjects

Late Positive Complex (a.k.a. “the” ‘P300’)



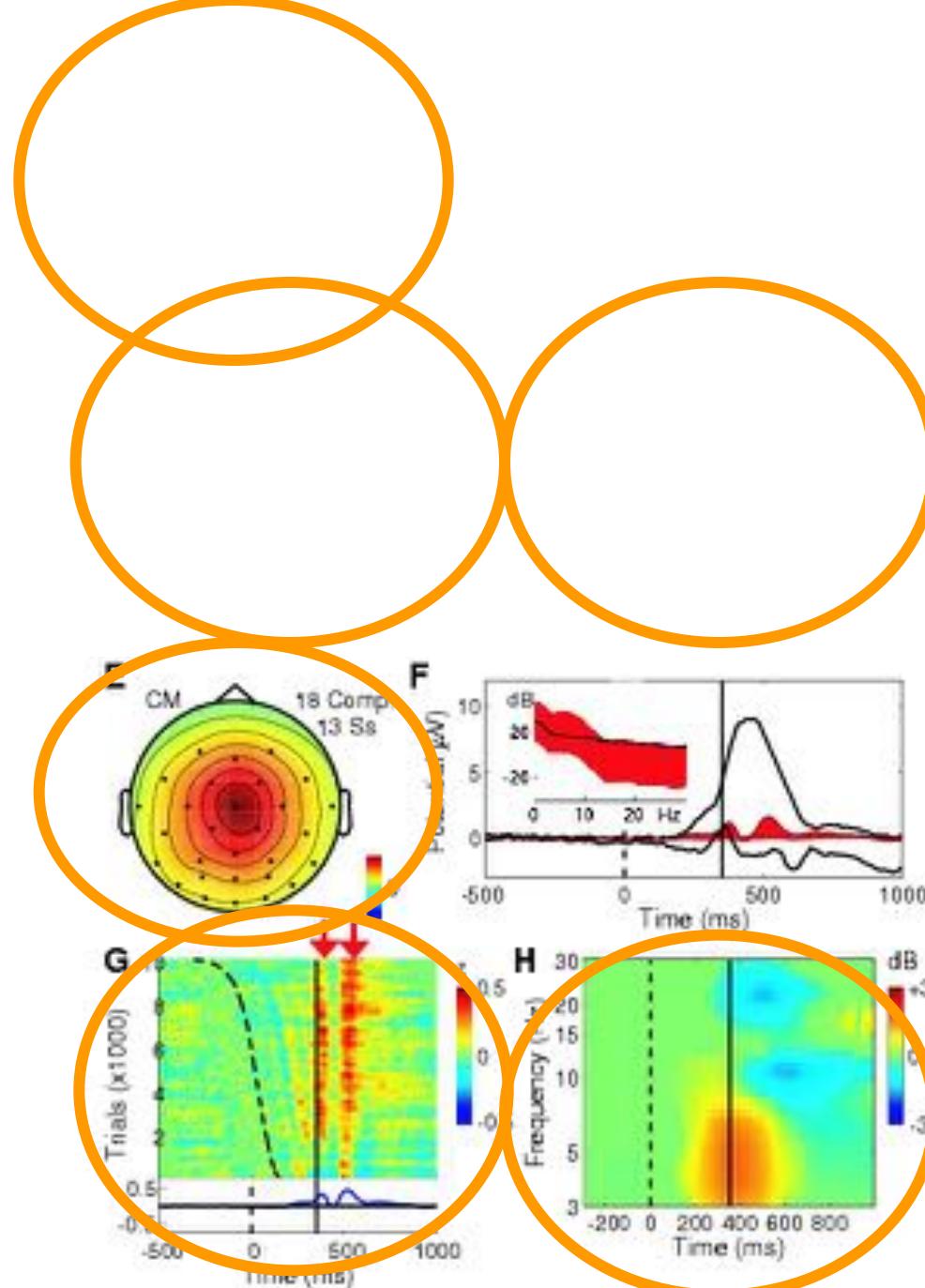
Far frontal cluster



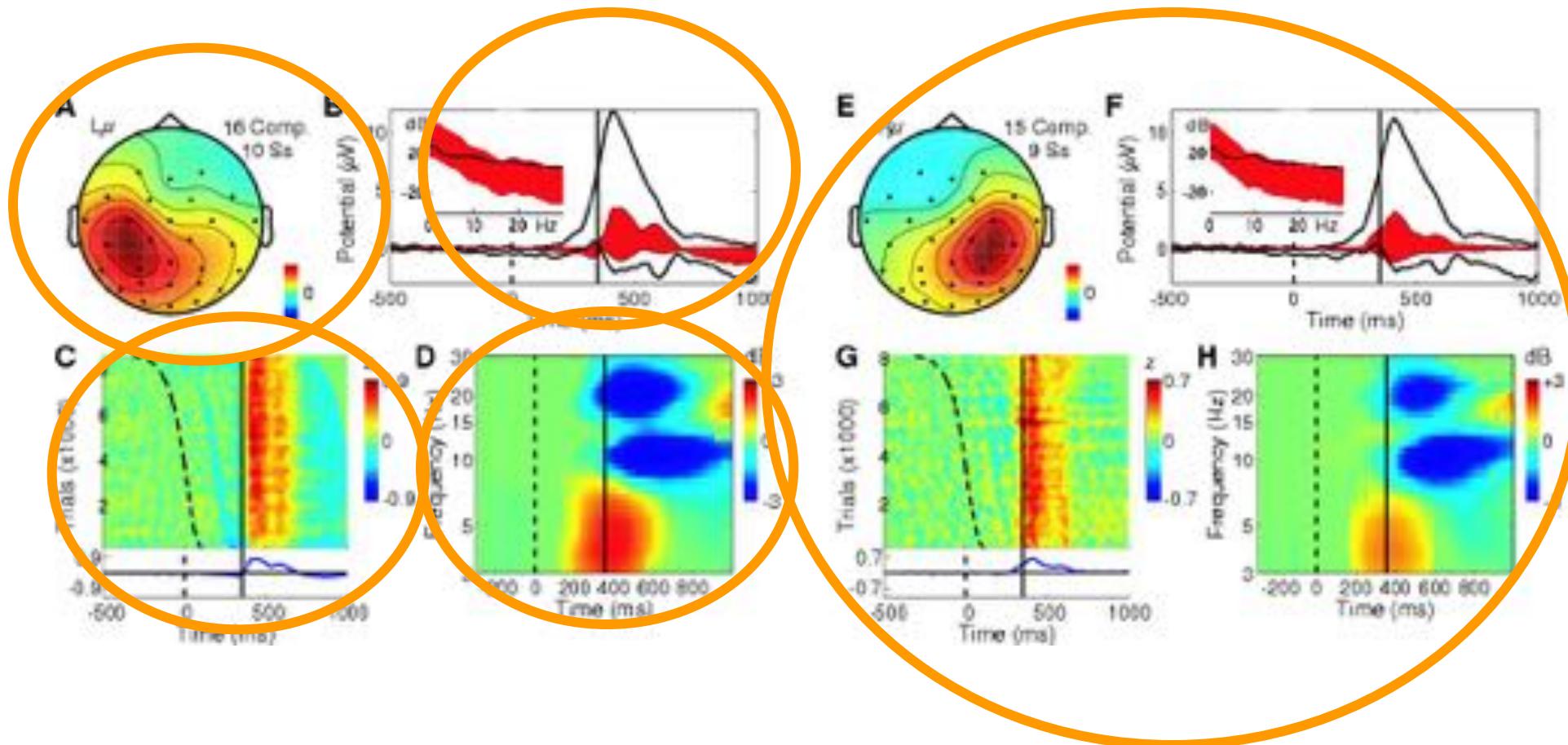
Medial parietal cluster

Far frontal cluster

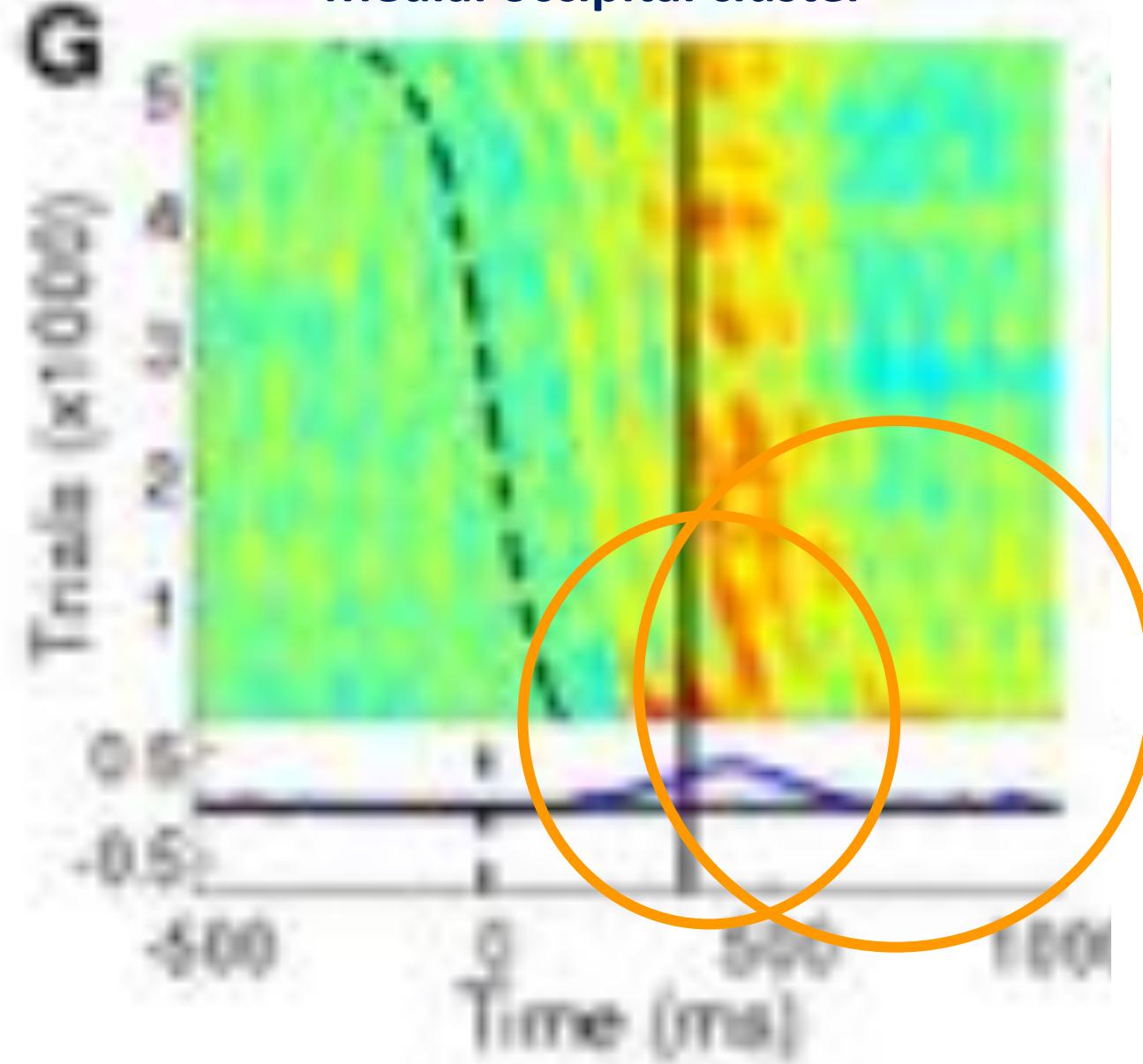
Medial central cluster



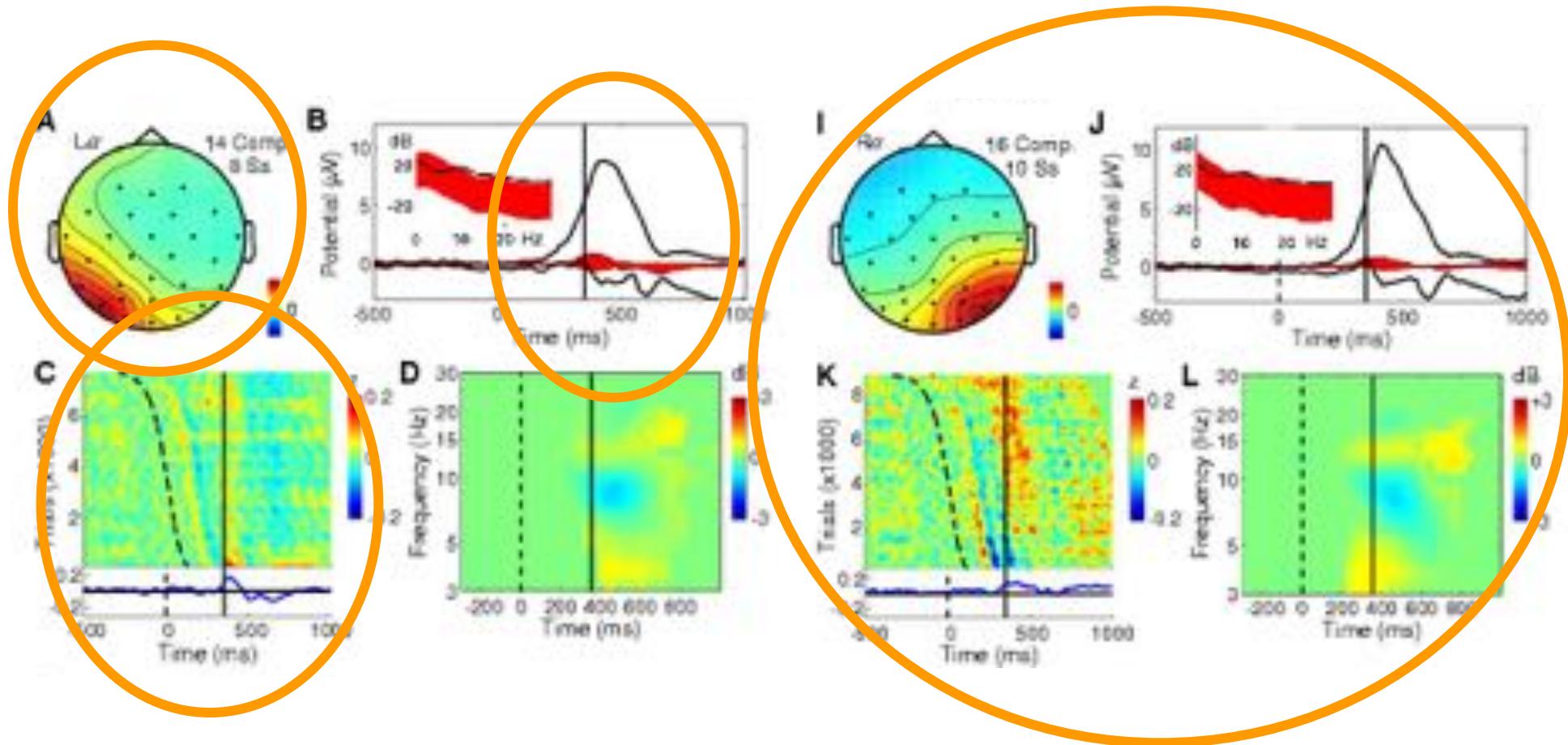
Hand somatomotor clusters



Medial occipital cluster

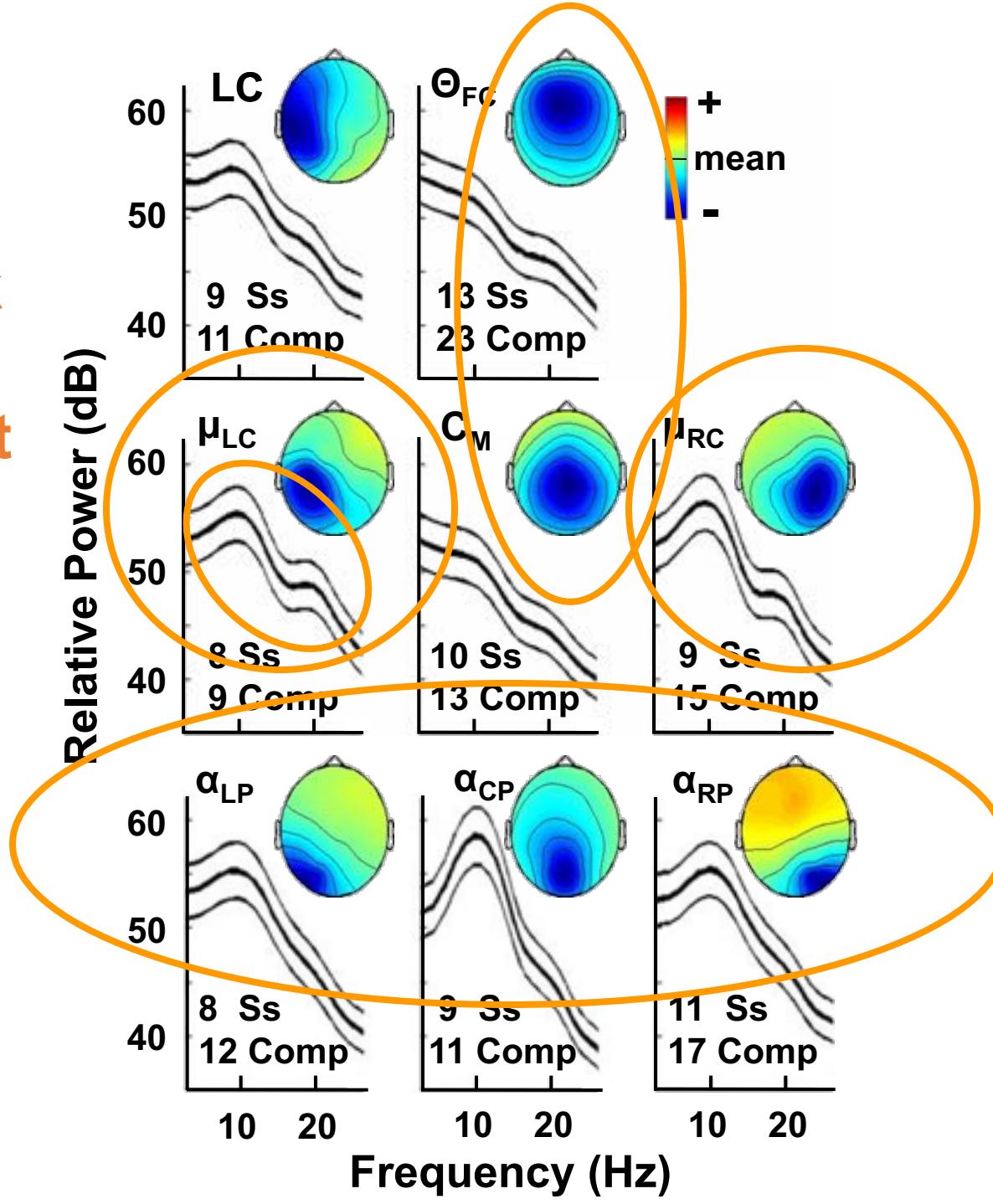


Lateral occipital clusters



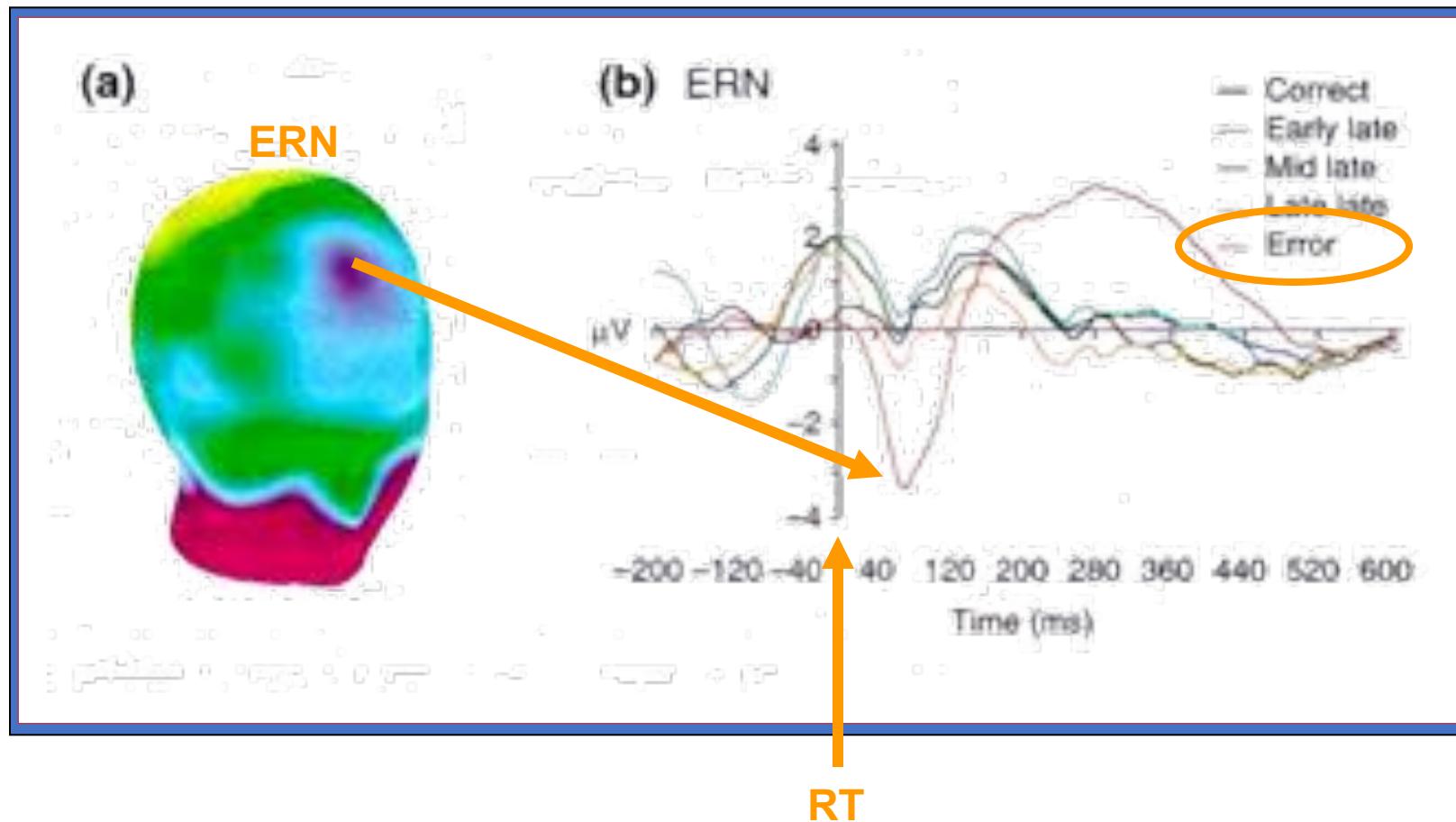
~~“The”~~ ‘P300’ → A Late Positive Complex

5-Box Task N1 Component Clusters



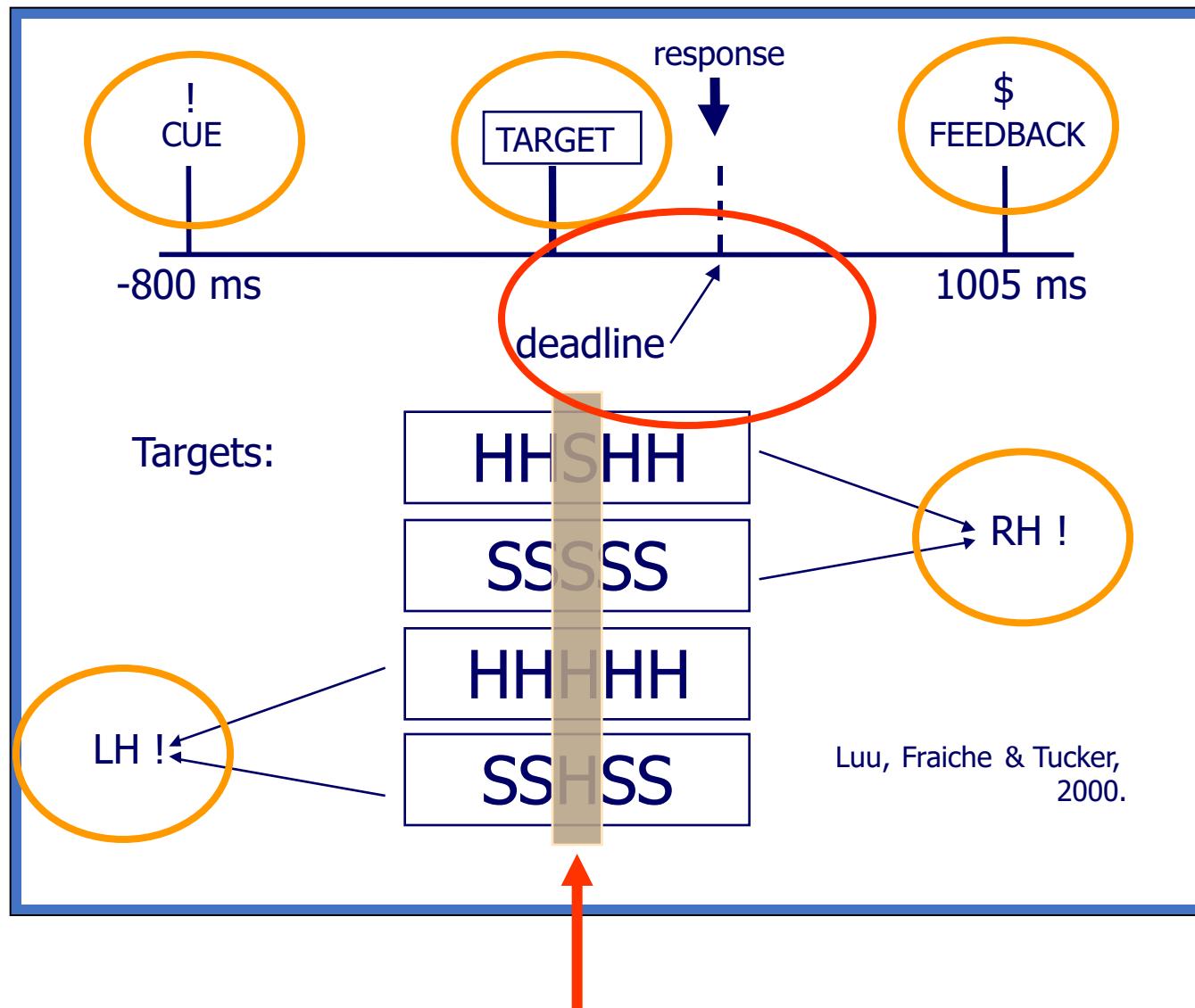
ERN

Error-Related Negativity (ERN)

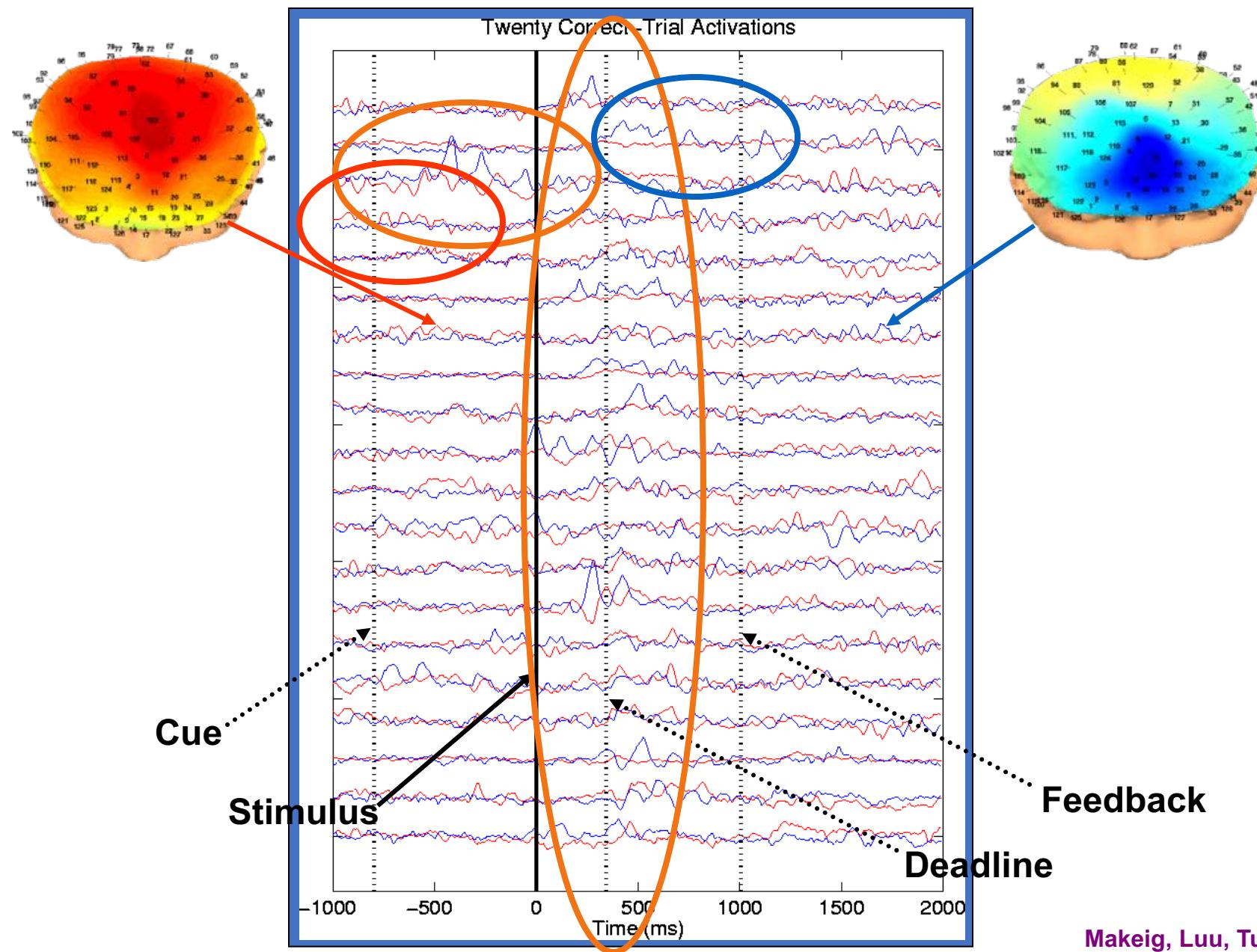


P Luu, in G Bush, Phan Luu, MI Posner
TICS 4(8):216-222 (2000)

A Forced-Choice Speeded Response Task

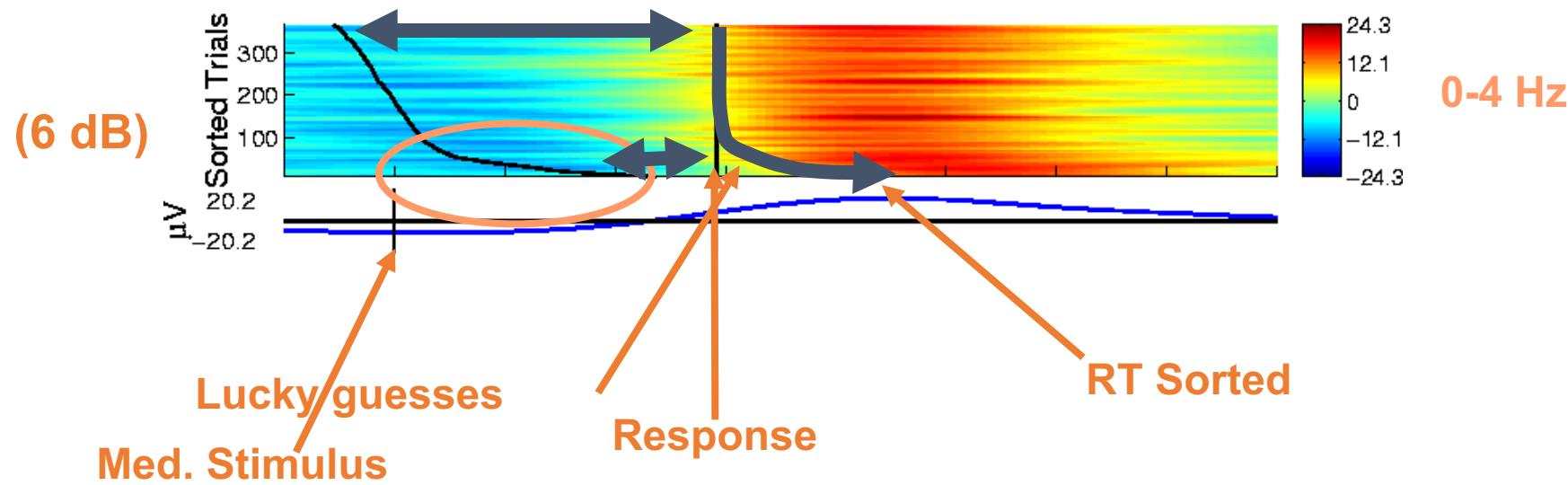
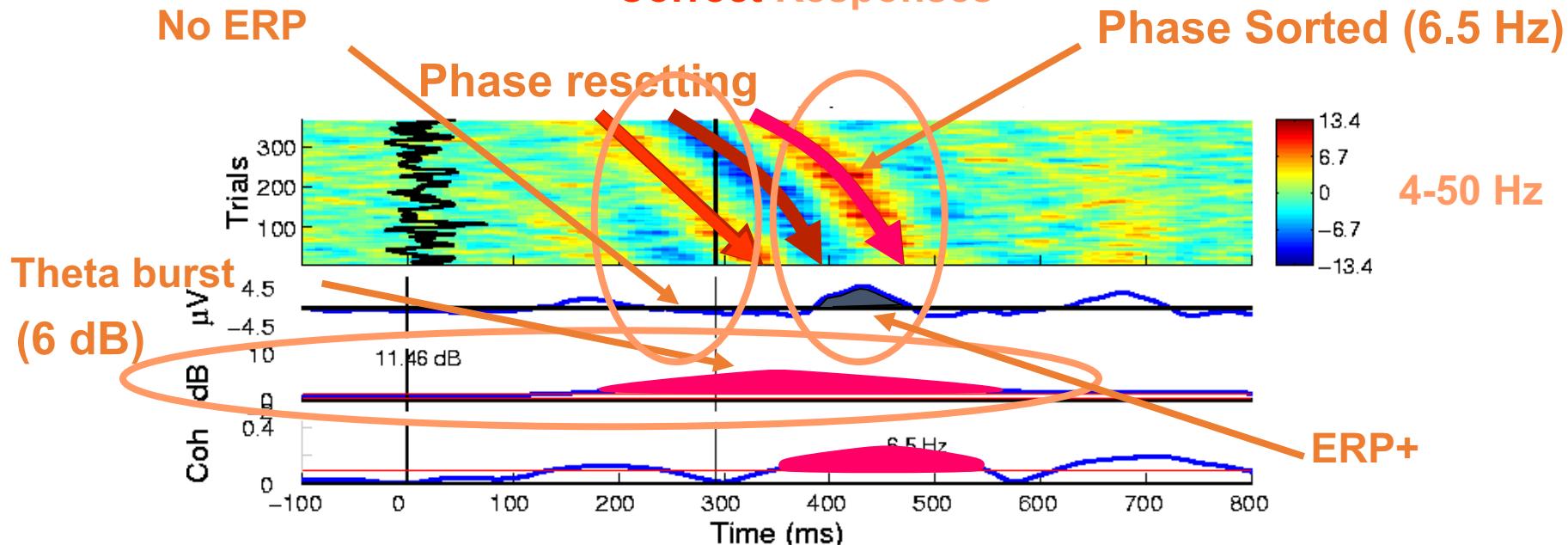


Theta Dynamics in Single Trials

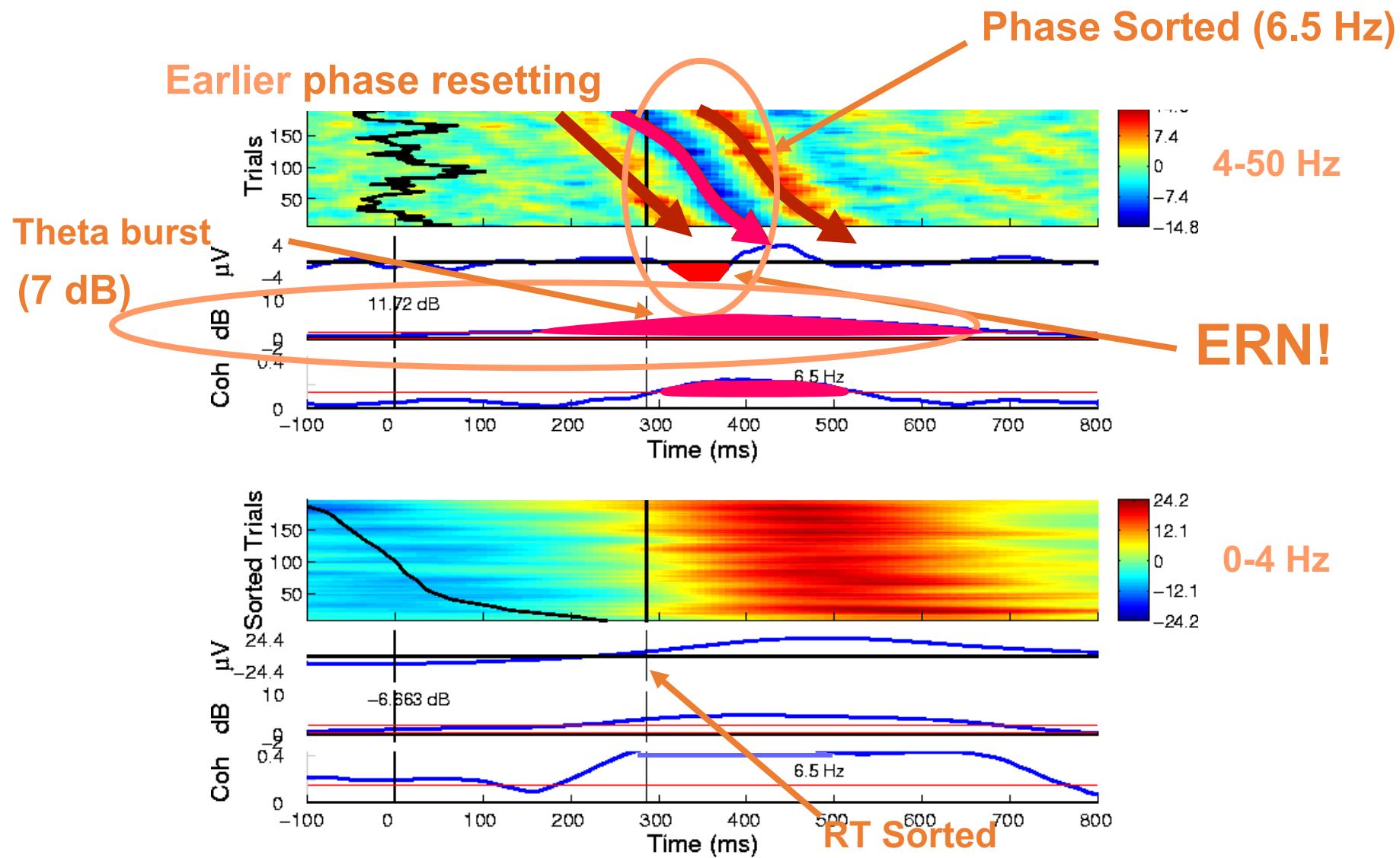


ERN COMPONENTS (fMT + cMT)

Correct Responses



ERN COMPONENTS (fMT + cMT) Incorrect Responses



Brain Dynamic Events

