NMA 2020
Project presentation

Pod_123_rose_ferret

Group Name: Chocolate Ice cream Junior

Submitted by

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With much help from

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Question

Choices precede our actions: some actions are so typical that one doesn't have to consciously put effort in selecting from available options, while others need some decision making to happen.

In the study done by Steinmetz et. al., the authors inserted Neuropixels probes into several brain regions spanned across the left hemisphere of the mouse and recorded their neuronal activity while the mouse was performing a high-contrast-stimuli selection, 2AFC task.

Our aim for this project was to understand the functional connectivity between the different brain areas during the decision making. In particular, we wanted to check if the LFP recordings related to the decision making period allow us to predict two different actions taken by the mouse (turn the wheel to the left or to the right).

Given the analysis done by the authors, we chose three brain areas related to action encoding: secondary motor area(MOs), midbrain reticular nucleus(MRN) and prelimbic area(PL).

Steinmetz Dataset

- 9 sessions (out of 39) have simultaneous recordings from the prelimbic area *PL* and secondary motor cortex *MOs*, and 7 sessions have simultaneous recordings from the prelimbic area *PL* and midbrain reticular nucleus *MRN.*
- 50 trials for each session.
- We used LFP data
- We chose different time windows
- Feature extraction:
    - Mean power of different frequency bands
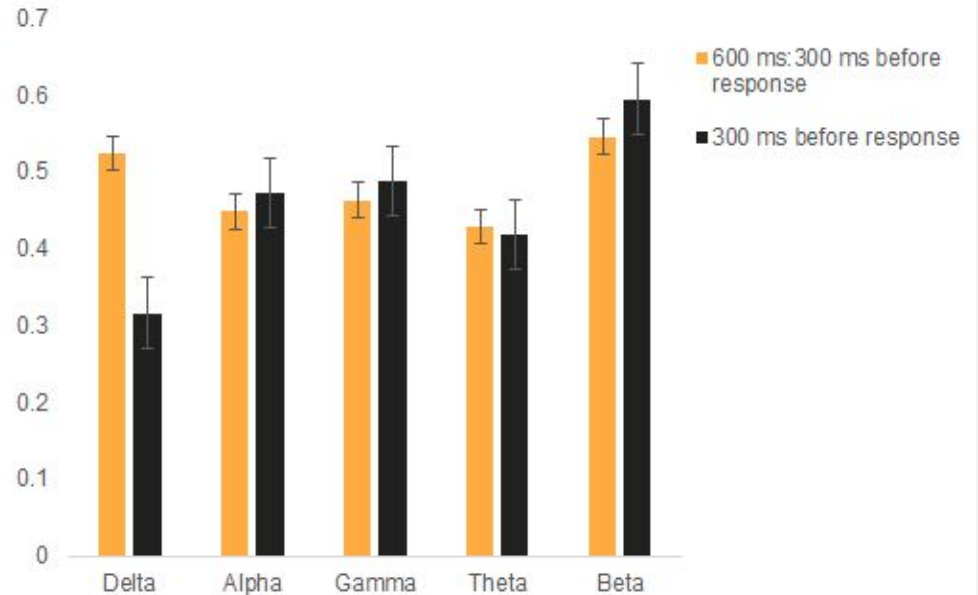
Approach

- Calculate the correlation between the two brain regions in each condition
- We used:
  - Pearson correlation
  - RDM(representational dissimilarity matrix)
- Two approaches for applying the correlation:
  - For each session separately then apply some statistics
  - For all the sessions at once.

Results
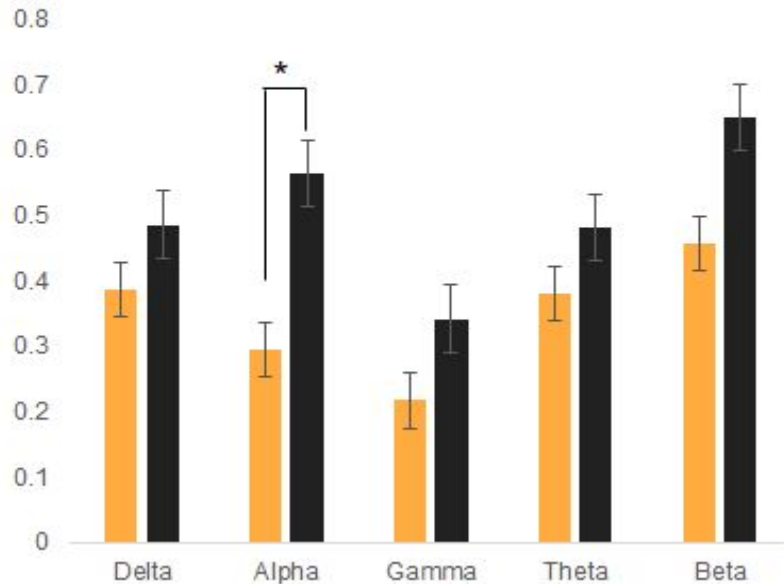
*p < 0.05

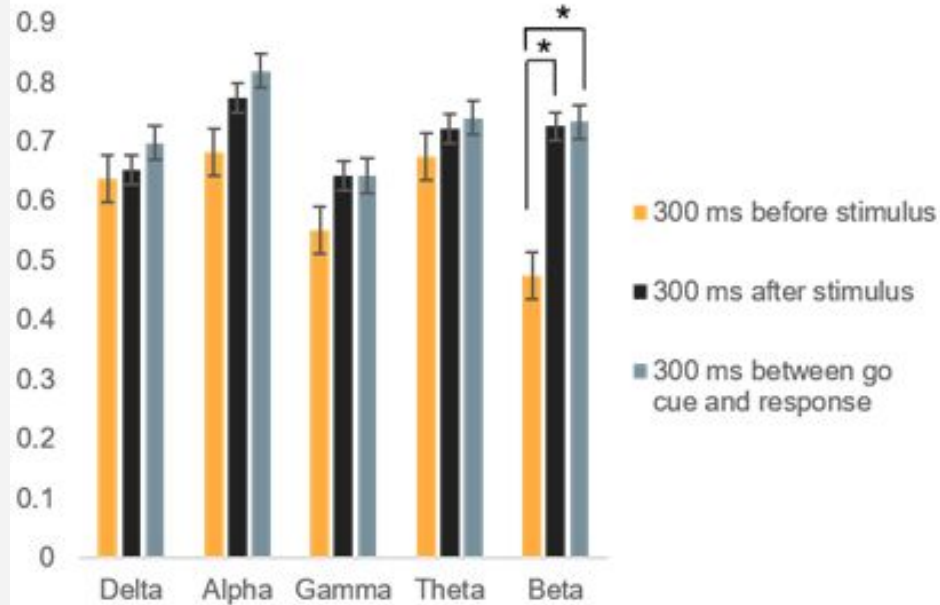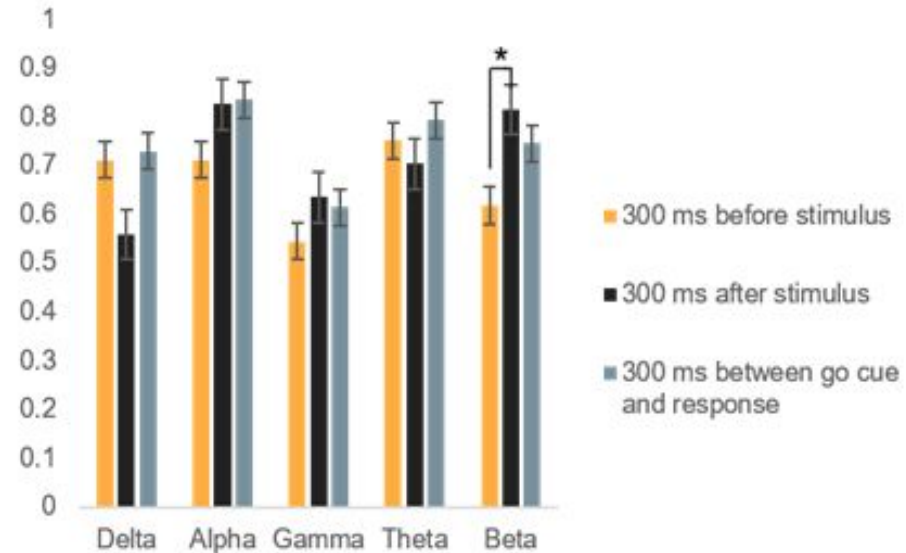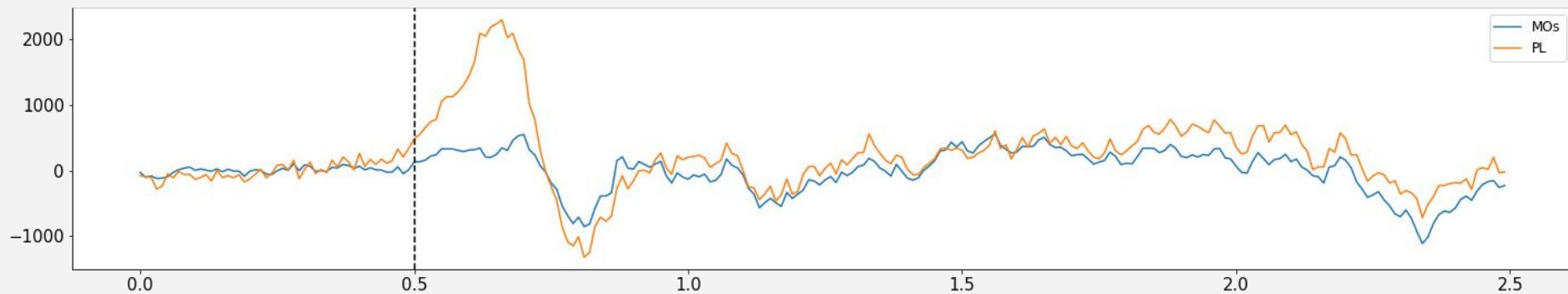Frequency bands correlation between PL and MOs (Right Turn)

Frequency bands correlation between PL and MOs (Left Turn)

*p < 0.05

ERP in MOs and PL after the stimulus

Consistent across all sessions and all response types.

Thank you!

We want to give our warm regards to the NMA team for making us part of this fantastic learning experience.

#NMA