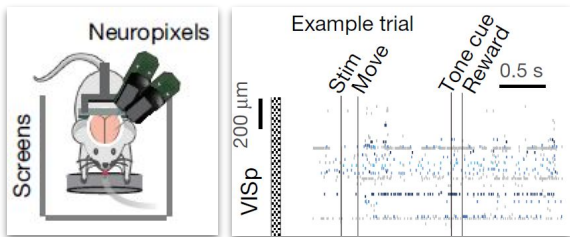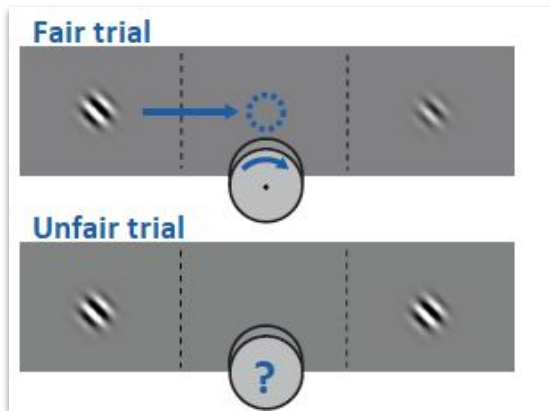# Decoding perceptual choices in the presence and absence of sensory information

By: Iacopo Hachen, Sarah McIntyre, Jorge Ramirez Ruiz,
       Henry Skelton, Eva Berg

neuromatch
academy

Pod: Antique-cicada / Mistaken Mice
Mentor: Marius Pachitariu
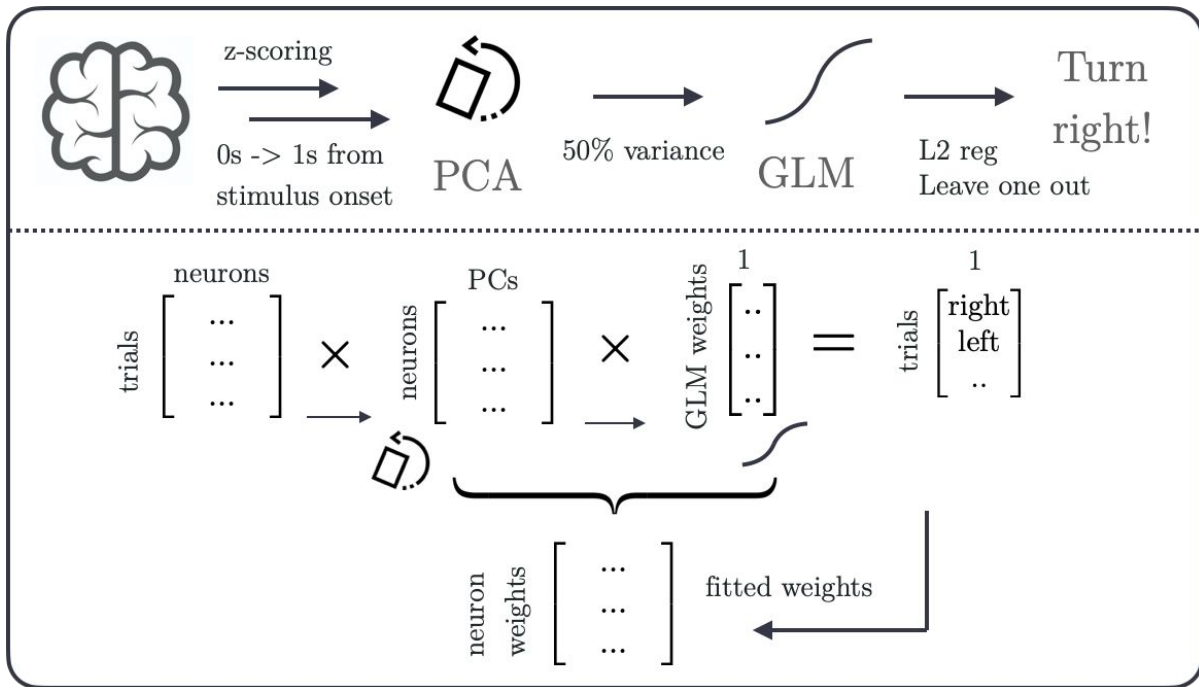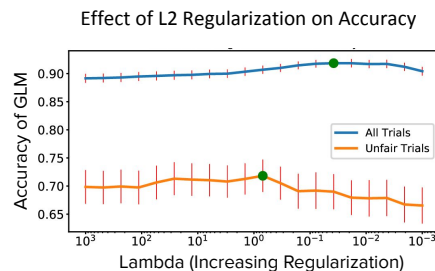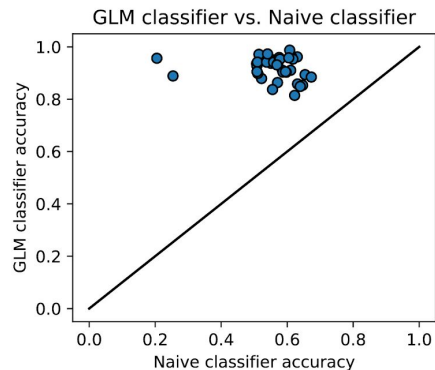
Experimental Setup and Methods

Steinmetz dataset:
~30.000 neurons from 42 brain regions
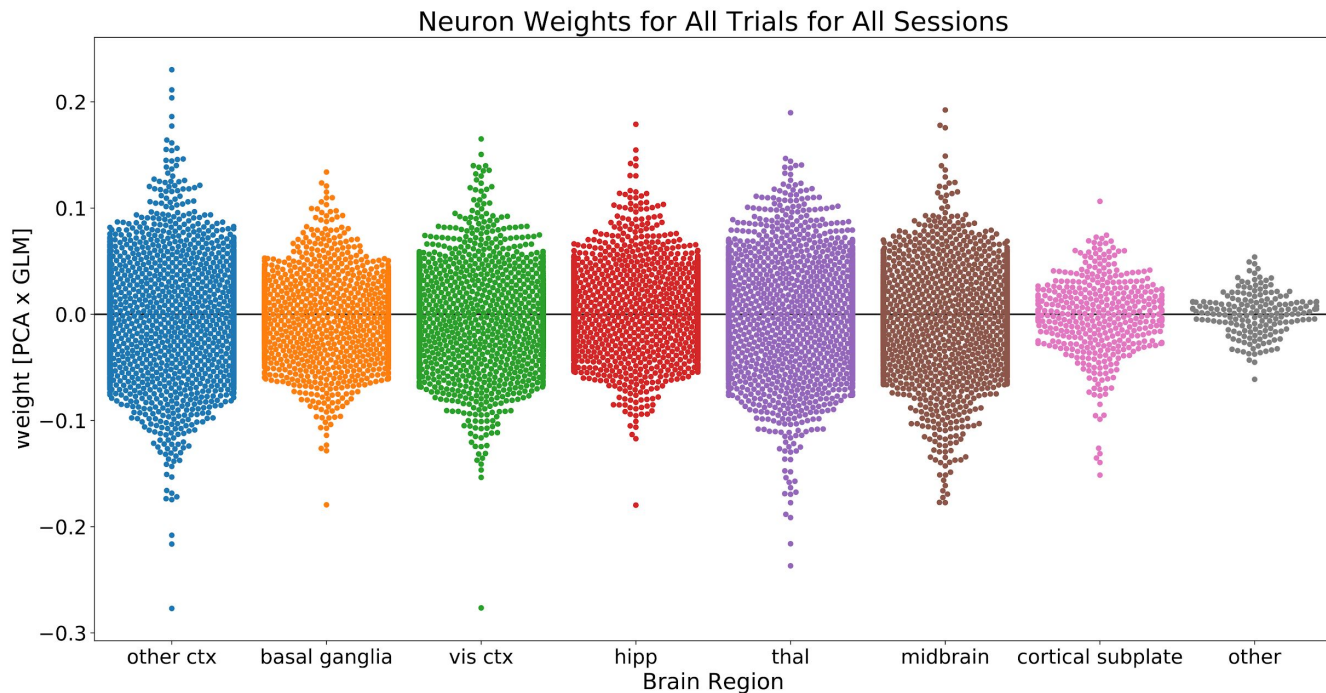39 sessions, 10 mice, 10 ms time bins
- Figures adapted from Steinmetz et. al. (2019). *Nature*, 10.1038/s41586-019-1787-x

Sanity-check: decoding decisions based on all trials

GLM classifier vs. Naive classifier

Effect of L2 Regularization on Accuracy

* Naive classifier always chooses the more commonly chosen side in trial

Neuron Weights for All Trials for All Sessions

➔ Our decoder works! (when given all trials)

Decoding decisions from "unfair" trials

GLM classifier vs. Naive classifier

Neuron Weights for Unfair Trials for All Sessions

Neuron Weights for Unfair Trials for Session 10
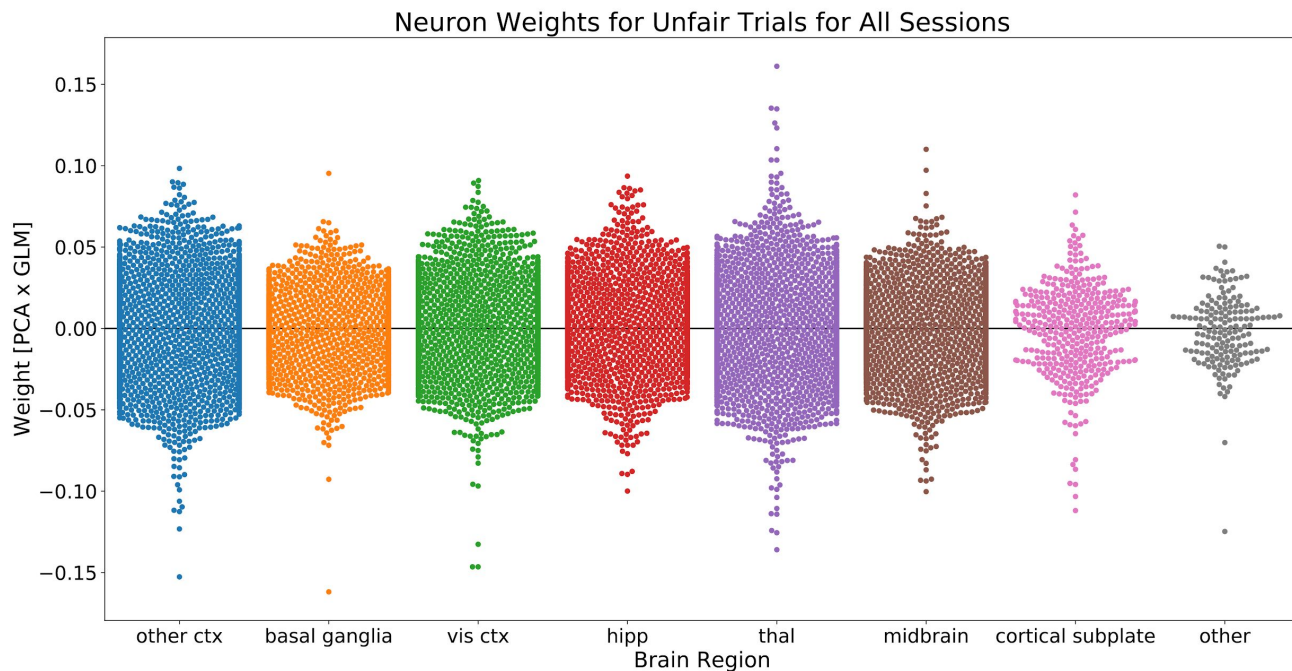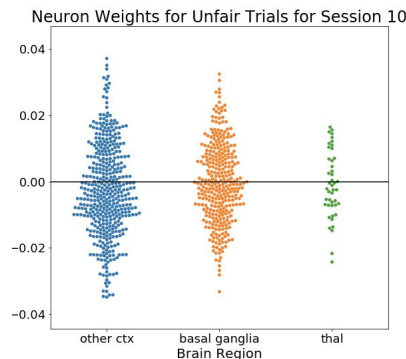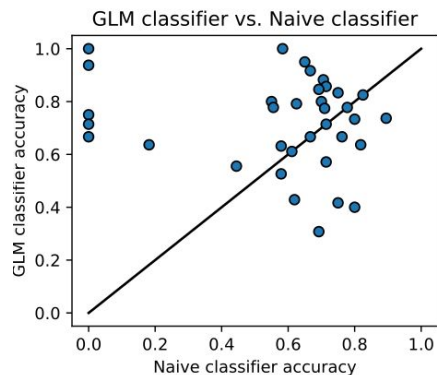
➜ Decoding behavior from "unfair" trials sometimes possible

Conclusions

- Appropriate combination of linear methods is a powerful tool for decoding

- Choice-related activity found in many brain areas

- The power of statistical power...
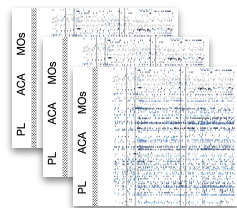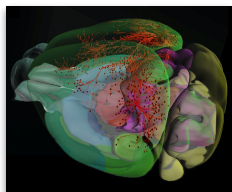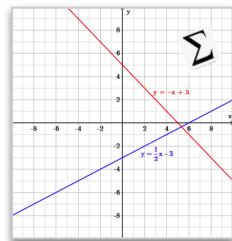
Future directions

- Different time bins to identify most-informative time windows (prediction possible?)

- Control analysis (trial-shuffled data to establish baseline for coefficients)