

Multiplexing in Face Selective Cortex: Evidence of Flexible Trial-By-Trial and Sub-Trial Representations of Multiple Stimuli

Submission ID 3000266
Submission Type Poster
Topic Neuroscience
Status Submitted
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SUBMISSION DETAILS

Presentation Type Either Poster or Oral Presentation

Presentation Abstract Summary Much of what we know about sensory processing comes from single stimuli studies. However, in the real world, many items are present at the same time. How does the brain represent multiple simultaneous stimuli, particularly when they recruit an overlapping neural population?

One possibility involves time-division multiplexing, or fluctuating activity patterns that allow coding of multiple items. We have recently developed statistical assessments for such fluctuating activity patterns and tested them in the auditory system (Caruso et al., 2017). Here we ask whether this multiplexing is a general phenomenon that occurs in other systems as well.

Specifically, we analyzed single cell activity from visual cortical face-selective regions (the medial fundus, MF, and anterior lateral, AL patches) while monkeys viewed multiple faces or faces and objects.

We found that activity in both MF and AL fluctuated across time (within and across trials), potentially allowing both stimuli to be represented. MF showed greater incidence of fluctuating activity than AL, and trial-by-trial fluctuations were more prevalent for face-face stimulus pairs, which presumably recruit a more overlapping population, than for face-object pairs, for which the overlap is less.

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Keywords

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time division multiplexing
population coding
naturalistic stimuli
face patches