

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

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Submitter valeria caruso

Affiliation Duke University

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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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Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
valeria *	caruso *	Duke University	valeria.c.caruso@gmail.com
Akinori	Ebihara	Rockefeller University	aebihara@mail.rockefeller.edu

Surya	Tokdar	Duke University	tokdar@stat.duke.edu
Winrich	Freiwald	Rockefeller University	wfreiwald@mail.rockefeller.edu
Jennifer	Groh	Duke University	jmgroh#duke.edu

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