

Face-selective neurons in the vicinity of the human fusiform face area

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Face perception is thought to be mediated by neural activity in the occipital and posterior temporal cortex.^{1,2} However, the face-selective neurons at the cellular level in these areas in humans have never been demonstrated. We had a rare opportunity to record intracranial multi-unit activity in an epilepsy patient near the fusiform face area² (figure 1A). We identified 2 units with highly face-selective response to static images of familiar (famous) and unfamiliar faces (figure 1B and video 1; figure e-1a, doi.org/10.5061/dryad.81t0fq1) as well as to human and animal faces that appeared in a movie (figure 1C, video 1, figure e-1b).

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Author contributions

V. Axelrod: conceiving the study, designing and preparing the experiments, analyzing the data, writing, editing and revising the manuscript. C. Rozier: data acquisition. T.S. Malkinson: data acquisition, editing the manuscript. K. Lehongre: responsibility for intracranial recording infrastructure, editing the manuscript. C. Adam: responsibility for intracranial recording infrastructure. V. Lambrecq: responsibility for intracranial recording infrastructure, editing the manuscript. V. Navarro: responsibility for intracranial recording infrastructure, editing the manuscript. L. Naccache: conceiving the study, supervising the project, editing the manuscript.

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Disclosure

The authors report no disclosures relevant to the manuscript. Go to Neurology.org/N for full disclosures.

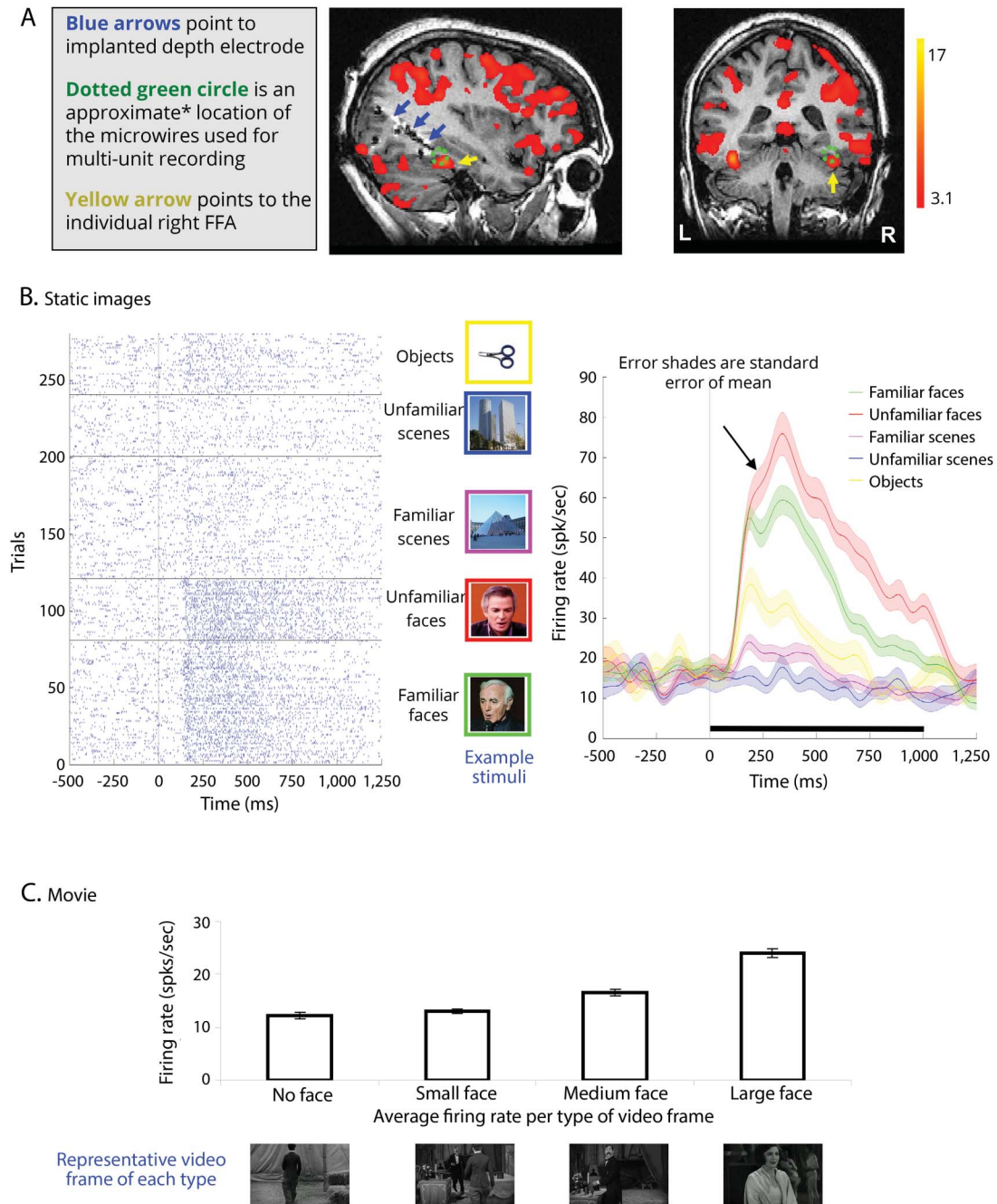
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Figure Recording location and the results of unit 1



1(A) Anatomic image with overlaid individual functional MRI activations (contrast: face > objects; $p < 0.001$, uncorrected). (B) Experiment with static images: left is a raster plot (horizontal gray lines separate the different conditions); right is across trials' mean instantaneous firing rate per condition. Note the high face-selectivity in both face conditions. Credits for images: unfamiliar scene: Avishai Taicher (CC BY 2.5), familiar scene: user: ewrfpiuqwnpiqfnpwi (CC BY 2.5), unfamiliar face: Moshe Sinai, familiar face: shutterstock.com. (C) Movie experiment (6-minute fragment of *The Circus* silent film). Movie frames ($n = 1,800$) were binned into 4 different types of frames of the movie: large, medium, small, and no faces. Note the higher average firing rate for frames with large faces. Error bars denote the standard error of mean. *Human electrophysiology does not permit us to establish unequivocally whether the units were within the boundaries of the fusiform face area (FFA; e-Methods, doi.org/10.5061/dryad.81t0fq1). Permission to reproduce material from *The Circus* movie: Charles Chaplin, *The Circus*; Copyright Roy Export SAS; all rights reserved (office@charliechapin.com).

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