

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

Vadim Axelrod, PhD, Camille Rozier, PhD, Tal Seidel Malkinson, PhD, Katia Lehongre, PhD, Claude Adam, MD, PhD, Virginie Lambrecq, MD, PhD, Vincent Navarro, MD, PhD, and Lionel Naccache, MD, PhD

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Correspondence

Dr. Axelrod
vadim.axelrod@gmail.com

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.

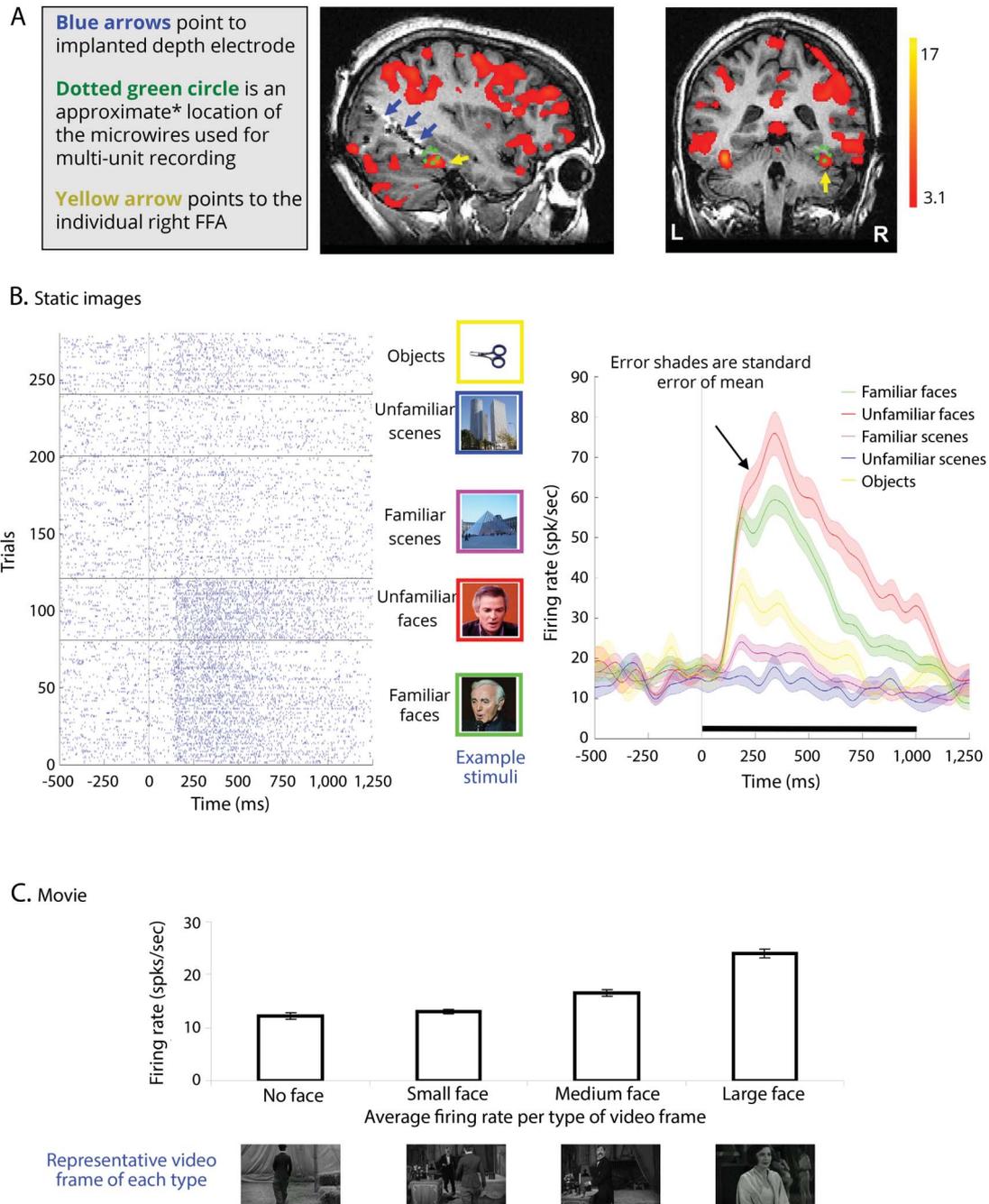
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From The Gonda Multidisciplinary Brain Research Center (V.A.), Bar Ilan University, Ramat Gan, Israel; Institut National de la Santé et de la Recherche Médicale Unité 1127 (C.R., T.S.M., K.L., V.L., V.N., L.N.), Centre National de la Recherche Scientifique Unité Mixte de Recherche (UMR) 7225, Sorbonne Université, Université Pierre-et-Marie-Curie Univ Paris 06 UMR S 1127, Institut du Cerveau et de la Moelle Épineuse; Centre de NeuroImagerie de Recherche-CENIR (K.L.), Institute of Brain and Spine, UMRS 1127, CNRS UMR 7225, Pitié-Salpêtrière Hospital; Epilepsy Unit and Neurophysiology Department (C.A., V.L., V.N.), AP-HP, GH Pitié-Salpêtrière-Charles Foix; and Departments of Neurology and Neurophysiology (L.N.), AP-HP, Groupe Hospitalier Pitié-Salpêtrière, Paris, France.

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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@charliechaplin.com).

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