research highlights

NEUROSCIENCE

Decoding facial recognition

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We recognize complex objects with ease and are especially quick to identify faces, even under changing viewing conditions. A central challenge in neuroscience has been to understand how the brain represents complex objects — a process thought to happen in the inferotemporal cortex, which has been shown to carry object-identity information, though the governing principles remain unknown.

Using a combination of brain imaging and single-neuron recordings of face-selective regions in the macaque brain during the presentation of systematically varied face images, Doris Tsao and colleagues at Caltech constructed an explicit model of face-selective cells that can both decode a face from neural responses and predict the firing of these cells in response to the presentation of an arbitrary face. In contrast with the hypothesis that there are detectors for specific individuals (for example, Jennifer Aniston cells) or exemplars, this work shows that neurons encode shape and appearance features (for example, lip contours) — abstract ingredients in a ‘face space’ that can be combined to generate any possible face. With only 205 cells, the authors were able to recreate the face that a monkey was viewing, highlighting the efficiency of this neural code.

Although face recognition is important, the underlying question is about object recognition as a whole — a far less homogenous space than that of faces. It remains to be seen whether feature-based codes can be extended to object recognition.

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