Face Module Activations Inform Non-Face Discrimination

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Submitter   Nicholas Blauch

Affiliation   Computational Memory and Perception Lab, Department of Psychological and Brain Sciences, UMass Amherst

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Presentation Abstract Summary   The extent to which modularity underlies brain function is unclear. A notable debate has concerned whether preferential activation to faces in the brain's fusiform gyrus indicates an underlying module for face processing ("Fusiform Face Area," e.g. Kanwisher et. al, 1997), or whether categorically distributed patterns of information in the region indicate its broader involvement in general visual processing (e.g. Haxby et. al, 2001). To interpret the patterns of findings in neuroimaging, we adopt a computational modeling approach utilizing a convolutional neural network trained for face-individuation – VGG-face (Parki, Vedaldi, and Zimmerman, 2015) – as an in toto face module. We zoom in on a deep hidden layer of the network as a representational model of a modular Fusiform Face Area. Inputting its activation patterns as features for multivariate classification, we replicate the neuroimaging findings of categorically distributed information, demonstrating that a face module produces information for discriminating non-face categories. Noting that the face module must process non-faces to produce such information, we discuss why a region specialized for face processing might process some non-face images.

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Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Nicholas *	Blauch *	Computational Memory and Perception Lab, Department of Psychological and Brain Sciences, UMass Amherst	nblauch@icloud.com

Elissa	Aminoff	Department of Psychology, Fordham University	eaminoff@fordham.edu
Michael	Tarr	Department of Psychology, Carnegie Mellon University	michaeltarr@cmu.edu

Keywords

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