Faces have a special place in the brain

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Image: Do you recognize this face? Researchers at the McGovern Institute have made inroads into understanding what happens in the brain when a person recognizes a face. No word on whether a face drawn in the snow counts. (Photo / Donna Coveney)

Are you tempted to trade in last year's digital camera for a newer model with even more megapixels? Researchers who make images of the human brain have the same obsession with increasing their pixel count, which increases the sharpness (or "spatial resolution") of their images. And improvements in spatial resolution are happening as fast in brain imaging research as they are in digital camera technology.

Nancy Kanwisher and colleagues at the McGovern Institute for Brain Research at MIT are now using their higher-resolution scans to produce much more detailed images of the brain than were possible just a couple years ago. Just as "hi-def" TV shows clearer views of a football game, these finely grained images are providing new answers to some very old questions in brain research.

One such question hinges on whether the brain is comprised of highly specialized parts, each optimized to conduct a single, very specific function. Or is it instead a general-purpose device that handles many tasks but specializes in none?

Using the higher-resolution scans, the Kanwisher team now provides some of the strongest evidence ever reported for extreme specialization. Their study appeared in the Nov. 23 issue of The Journal of Neuroscience.

The study focuses on face recognition, long considered an example of brain specialization. In the 1990s, researchers including Kanwisher identified a region known as the fusiform face area (FFA) as a potential brain center for face recognition. They pointed to evidence from brain-imaging experiments, and to the fact that people with damage to this brain region cannot recognize faces, even those of their family and closest friends.

However, more recent brain-imaging experiments have challenged this claimed specialization by showing that this region also responds strongly when people see images of bodies and body parts, not just faces. The new study now answers this challenge and supports the original specialization theory.

The researchers suspected that the strong response of the face area to both faces and bodies might result from the blurring together of two distinct but neighboring brain regions that are too close together to distinguish at standard scanning resolutions.

To test this idea, they increased the resolution of their images (like increasing the megapixels on a digital camera) ten-fold to get sharper images of brain function. Indeed, at this higher resolution they could clearly distinguish two neighboring regions. One was primarily active

when people saw faces (not bodies), and the other when people saw bodies (not faces).

This finding supports the original claim that the face area is in fact dedicated exclusively to face processing. The results further demonstrate a similar degree of specialization for the new "body region" next door.

Kanwisher is the Ellen Swallow Richards Professor of Cognitive Neuroscience. Her colleagues on this work are Rebecca Frye Schwarzlose, a graduate student in brain and cognitive sciences, and Christopher Baker, a postdoctoral researcher in the department.

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Source: MIT (by Cathryn M. Delude)