

With the Brain, Is Seeing Believing?

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They're everywhere these days: colorful images showing the human brain in action. With the advent of CT and PET scans, and now the growing use of functional magnetic resonance imaging, or fMRI, researchers' ability to correlate psychological processes with the activation of different brain areas is producing startling findings, seemingly every week. But according to APS Charter Member Carole Wade, Dominican University of California, our justifiable enthusiasm over the new imaging technology needs to be tempered with a dose of caution.

Wade delivered the 2005 distinguished lecture, "PET Scans and Pet Theories: Neuroscience's Challenge for Psychology," at the 12th Annual APS- Society for the Teaching of Psychology Teaching Institute, part of the APS Annual Convention in Los Angeles.

According to Wade, neuroimaging research, although undeniably promising, still has a number of methodological and conceptual problems to overcome. Sample sizes in studies are often quite low, numerous confounds can affect results, and images are often manipulated in arbitrary ways to accentuate or deemphasize differences between brains. "Small contrasts can be made to look dramatic, larger ones to look trivial," Wade said. And there is little general agreement as to how to interpret results.

In neuroscience reporting, extreme scans are routinely juxtaposed to create an impression of a larger effect than may actually exist. Particularly when hyped by a media unaware of the methodological problems, such brain images may become iconic, and they are easily misused, Wade warned, for ideological or didactic reasons. She cited recent introduction of brain scans as evidence in court cases and their misleading use in public health messages and the popular media.

A big danger, according to Wade, comes from the fact that seeing is believing. You can't see psychological constructs like "love" or "motivation," but with the new imaging technologies, we can see pictures of the brain's patterns of activation while experiment participants are engaged in particular tasks or feeling particular emotions. This has encouraged some researchers to identify specific brain areas that correspond to complex psychological processes or experiences — Wade cited the much-touted discovery a few years ago of the "God spot" in the temporal lobe, supposedly the locus of religious belief.

Wade pointed out, however, that even if a certain brain area is necessary for a given process, that may not be sufficient to explain it; yet images will give the impression that the highlighted area is the "center" for that process. Most psychological constructs, although denoted by a single word (e.g., "belief" or "love"), "actually cover an intricate and complicated series of operations or processes" that would be difficult, perhaps even impossible, to ever completely map out.

Brain images may also lead people to see the findings of brain research as somehow "harder" than those of traditional psychological research, and to be tempted to reduce psychology to biology.

“Every revolution in science begins with this kind of uncritical zeal,” Wade noted, and she reiterated that some of the new findings from fMRI studies are truly revolutionary — even eerie. But, quoting from another research team who uses neuroimaging in their work, Wade said, “Just because you’re imaging the brain doesn’t mean you can stop using your head.”¹

¹From Cacioppo et al. (2003). Just because you’re imaging the brain doesn’t mean you can stop using your head: A primer and set of first principles. *Journal of Personality and Social Psychology*, 85, 650-661.