COMMENTARY

Perceptual Priming and Extrastriate Cortex: Consensus and Controversy

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Perceptual priming refers to a change in the ability to identify a stimulus as a result of a previous encounter with the same stimulus. The neuroanatomical correlates of perceptual priming have been explored in several studies, and the results converge in showing that priming is associated with reduced activity in extrastriate cortex, frequently in right dorsal Brodmann area (dBA) 19. Tasks used to demonstrate this effect include word-stem completion and word-fragment completion. It is generally agreed that such completion tasks are not “pure” measures of perceptual priming, but the test performance may also reflect conceptual processes. This leaves open the possibility that reduced extrastriate activity is not associated with perceptual priming, or that this response reflects a combination of perceptual and conceptual processes. To examine this issue, Badgaiyan [2000] used fMRI and a picture identification test to study the neuroanatomical correlates of priming. Prior to scanning subjects were shown a list of pictures. Two minutes after the presentation phase they were shown target and novel pictures subliminally (16 msec/picture), and their task was to try to identify each picture. Identification was quite difficult in the unprimed condition (when the pictures had not been included in the initial presentation), but subjects were able to identify most pictures in the primed condition. This way of measuring priming should be relatively “pure,” so a finding of reduced extrastriate activation could be taken as a true correlate of perceptual priming. Analysis of fMRI data acquired at the identification phase revealed a

priming-related decrease in activity in right extrastriate cortex (dBA 19). This observation is in excellent agreement with previous findings, and provides strong support that decreased activity in extrastriate cortex is associated with *perceptual* priming.

The functional significance of this neural response is more controversial. Badgaiyan [2000] argued that “reduced activation of the extrastriate cortex seems to be associated specifically with retrieval of perceptually driven information.” This suggestion is supported by their previous observation that cross-modal priming is not associated with reduced extrastriate activation [Badgaiyan et al., 1999]. Most noteworthy, in their previous study, they found that reduced extrastriate activation is not only seen for within-modality visual priming, but also for within-modality auditory priming. As concluded by Badgaiyan et al. [1999], this finding indicates that decreased activity in extrastriate cortex reflects changes in more general (amodal) priming processes. This interpretation can be related to the recent suggestion by Bäckman et al. [2000] that dBA 19 may not only represent perceptual information but also associations between semantic and perceptual information. This suggestion was based on a finding of *increased* priming-related extrastriate activity for patients with Alzheimer’s disease (elderly controls showed decreased activity). Increased priming-related activity has also been observed for novel three-dimensional objects [Schacter et al., 1995], and a recent study points to the importance of preexisting stimulus representations [Henson et al., 2000]. To the extent that Alzheimer’s disease affects stimulus representations, this factor may explain the atypical regional response of the Alzheimer patients in the Bäckman et al. study [cf., Börjesson, 2000]. Taken together, these and other studies indicate that for dBA 19, as with the fusiform gyrus [Henson et al., 2000], priming-related neural

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responses may not be unitary, but depend on factors such as preexisting stimulus representations. Further elegant experimental PET and fMRI designs, as represented by the current Badgaiyan study, will shed additional light on this issue.

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