

## Does lateral parietal cortex support episodic memory? Evidence from focal lesion patients

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### Abstract

Although neuroimaging and human lesion studies agree that the medial parietal region plays a critical role in episodic memory, many neuroimaging studies have also implicated *lateral* parietal cortex, leading some researchers to suggest that the lateral region plays a heretofore underappreciated role in episodic memory. Because there are very few extant lesion data on this matter, we examined memory in six cases of focal lateral parietal damage, using both clinical and experimental measures, in which we distinguished between recollection and familiarity. The patients did not have amnesia, but they did show evidence of disrupted recollection on an anterograde memory task. Although the exact mechanisms remain to be elucidated, lateral parietal damage appears to impair some aspects of episodic memory.

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Medial temporal and prefrontal regions of the brain are necessary for episodic memory (i.e., conscious memory for personally experienced events within a particular spatiotemporal context; for reviews, see Baldo & Shimamura, 2002; Davidson, Troyer, & Moscovitch, 2006; Moscovitch, Nadel, Winocur, Gilboa, & Rosenbaum, 2006; Moscovitch et al., 2005; Squire, Stark, & Clark, 2004; Tulving, 2002). Recently, however, several independent reviews (Naghavi & Nyberg, 2005; Skinner & Fernandes, 2007; Wagner, Shannon, Kahn, & Buckner, 2005), following Rugg and colleagues' observations with event-related potentials (e.g., Rugg & Wilding, 1996), have pointed out that functional neuroimaging studies of episodic memory tend to show significantly greater activation in *parietal* regions for

previously studied items that are correctly recognized as old, compared to unstudied items that are correctly identified as new. Furthermore, some studies have suggested that parietal activations are stronger in cases where one has a vivid, clear *recollection* (i.e., *remembering*) of an item and the contextual details surrounding it, as opposed to a more intuitive feeling of *familiarity* (i.e., *knowing* that the stimulus has been encountered recently without awareness of the context in which it appeared; Tulving, 1985). These findings have led some researchers to suggest that parietal cortex plays a heretofore underappreciated role in episodic memory. Such an assertion is provocative, however, because memory is not a function that has traditionally been ascribed to the parietal lobe. Classic texts on the functions of parietal cortex have made scant mention of memory (e.g., Critchley, 1953; Luria, 1966), and those on the neuropsychology of memory have said little about the parietal lobe (e.g., Luria, 1976). In the interest of seeking convergence with the functional neuroimaging data, we examined the literature on

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