BRIEF SUMMARY

Buckner, R. L., Koutstaal, W., Schacter, D. L., Dale, A. M., Rotte, M., & Rosen, B. R. (1998). Functional-anatomic study of episodic retrieval: II. Selective averaging of event-related fMRI trials to test the retrieval success hypothesis. *NeuroImage, 7,* 163–175.

In a companion paper (R. L. Buckner et al., 1998, NeuroImage 7, 151-162) we used fMRI to identify brain areas activated by episodic memory retrieval. Prefrontal areas were shown to differentiate component processes related to retrieval success and retrieval effort in block-designed paradigms. Importantly, a right anterior prefrontal area was most active during task blocks involving greatest retrieval success, consistent with an earlier PET study by M. D. Rugg et al. (1996, Brain 119, 2073-2083). However, manipulation of these variables within the context of blocked trials confounds differences related to varying levels of retrieval success with potential shifts in subjects' strategies due to changes in the probability of target events across blocks. To test more rigorously the hypothesis that certain areas are directly related to retrieval success, we adopted recently developed procedures for event-related fMRI. Fourteen subjects studied words under deep encoding and were then tested in a mixed trial paradigm where old and new words were randomly presented. This recognition testing procedure activated similar areas to the blocked trial paradigm, with all areas showing similar levels of activation across old and new items. Of critical importance, significant activation was detected in right anterior prefrontal cortex for new items when subjects correctly indicated they were new (correct rejections). These findings go against the retrieval success hypothesis as formally proposed and provide an important constraint for interpretation of this region's role in episodic retrieval. Furthermore, anterior prefrontal activation was found to occur late, relative to other brain areas, suggesting that it may be involved in retrieval verification or monitoring processes or perhaps even in anticipation of subsequent trial events (although an alternative possibility, that the late onset is mediated by a late vascular response, cannot be ruled out). These findings and their relation to the results obtained in the companion blocked-trial paradigm are discussed.