The Role of Perceptual Fan in Explicit Recognition: Functional Neuroimaging Evidence

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Abstract: A conceptual fan effect is the finding that as participants study more items related to a concept, retrieval latency and errors for any particular item increases. Previous behavioral research in our laboratory suggests that the perceptual features of the stimulus influence memory in a manner that is analogous to the influence of conceptual features; that is, we have demonstrated a perceptual fan effect in explicit recognition judgments. These experiments involve presenting words in different, distinctive fonts. The number of fonts studied with a word and the number of words studied with a font were manipulated. Each word-font pair was presented five times during the encoding phase. The subject's task was to recognize whether the probe represented a word that had been studied in that font during the encoding phase. In our behavioral research, we found performance decrements in both latency and accuracy when the target word had been studied with multiple fonts or the font of the target had been studied with multiple words. In an event-related fMRI experiment, scans were obtained during the test phase. Here too we found an effect of perceptual interference (i.e., fan). With more interference, there was greater activation in perceptual processing regions, for example, bilateral extrastriate cortex. This suggests that explicit memory judgments are not independent of perceptual processing.