

Multivariate Pattern Analysis Reveals Semantic Information in Brain Areas Activated for Nonwords

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Presentation Abstract Summary The neural basis of semantic cognition has been investigated using univariate analysis of functional magnetic resonance imaging (fMRI) data for at least the past 20 years, revealing neural regions involved in the putative neural semantic network, which significantly overlaps with the default mode network (DMN). However, there have been some inconsistencies across fMRI studies in terms of the primary regions involved in semantic processing. These discrepancies have most often been found in studies that manipulate the level of task difficulty, where increasing levels of difficulty activate regions outside of the semantic network/DMN. We recently observed this pattern in a lexical decision task with high and low imageability words, where the word-nonword contrast revealed nonword activation primarily in the DMN. We investigated whether the semantic areas activated for nonwords also encoded semantic information. This was determined by classifying high and low imageability words using multivariate pattern analysis. We trained a classifier on fMRI data restricted to the nonword contrast to determine whether participants were reading high or low imageability words. It reliably classified imageability category at 83.3% accuracy ($p < .05$). This suggests that semantic information is present even in areas activated by meaningless nonwords.

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