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Object concepts in the brain: A representational similarity analysis of features and categories

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Abstract

How are features and categories of objects represented in the brain? While numerous studies have identified category-specific regions for different categories of objects, the nature of the representation for individual objects remains elusive. We investigated this question by employing representational similarity analysis (Kriegskorte et al., 2006) to identify different types of object information reflected in fMRI activation patterns. Relying on Clarke et al's (2014) object naming data, we conducted a searchlight mapping analysis to assess whether the object dissimilarity predicted by various theoretical models of object categories and features corresponded to the dissimilarity defined by fMRI activity patterns. The object feature models we contrasted were based on three different sets of feature norms: (a) norming data we obtained from a dataset of 78,000 features produced by 100 participants for a set of 264 pictures (Antal et al., 2024), (b) the CLSB word feature norms (Devereux et al., 2014), and (c) McRae et al's (2005) word feature norms. Results will address the contribution of feature information to the representation of different object categories.