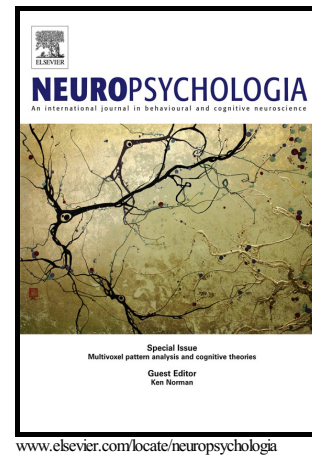


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# On the partnership between neural representations of object categories and visual features in the ventral visual pathway

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## Abstract

A dominant view in the cognitive neuroscience of object vision is that regions of the ventral visual pathway exhibit some degree of category selectivity. However, recent findings obtained with multivariate pattern analyses (MVPA) suggest that apparent category selectivity in these regions is dependent on more basic visual features of stimuli. In which case a rethinking of the function and organization of the ventral pathway may be in order. We suggest that addressing this issue of functional specificity requires clear coding hypotheses, about object category and visual features, which make contrasting predictions about neuroimaging results in ventral pathway regions. One way to differentiate between categorical and featural coding hypotheses is to test for residual categorical effects: effects of category selectivity that cannot be accounted for by visual features of stimuli. A strong method for testing these effects, we argue, is to make object category and target visual features orthogonal in stimulus design. Recent studies that adopt this approach support a feature-based categorical coding hypothesis according to which regions of the ventral stream do indeed code for object category, but in a format at least partially based on the visual features of stimuli.

## 1. Introduction

It is manifest from our everyday experience that we categorize the objects we see. For example, if we see a cat walking down the street, we do not see it simply as a mobile shape, with furry texture, but *as* an animate creature, an animal, a cat, or possibly our own cat. Even in the extreme case of ambiguous stimuli that are intermediate between two categories, we typically still group the stimuli into one or the other category, instead of experiencing some vague, indeterminate perception (Harnad, 1987). Yet, research aimed at localizing this capacity to particular visual brain regions has sometimes been met with skepticism.

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