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Why Is a Verb Like an Inanimate Object? Grammatical Category and Semantic Category Deficits

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Semantic category effects, such as difficulties in naming animate things relative to inanimate objects, have been explained in terms of the relative weightings of perceptual and functional features within the semantic representations of these concepts. We argue that grammatical category deficits, such as difficulties in naming nouns relative to verbs, can be explained within the same framework. We hypothesize that verb concepts are richer in functional than sensory features and present a model of the semantic representations of animate nouns, inanimate nouns, and verbs. The model demonstrates that sensory feature damage results in a deficit for naming living things but spares verb naming, and functional feature damage results in a deficit for naming inanimate objects and verbs. We then report the assessment results of two patient groups. In accordance with the model's predictions, the ''verb spared'' patients were consistently worse at naming living things than inanimate objects, and their definitions of both living and nonliving items were lacking in sensory information. We conclude that damage to sensory features in semantic representations causes difficulties in naming concrete nouns relative to action verbs, and within the grammatical category of nouns, animate items will be more severely affected. Imageability was shown to be a strong predictor of naming performance in the ''verb deficit'' patients, and when this variable was controlled no class effect remained. Production of definitions revealed no differential damage to sensory or functional features, and no consistent effect of animacy in naming was shown. While the model suggests that verb deficits might occur in patients for whom functional features are damaged relative to sensory features, we conclude that the ''verb deficit'' shown in our patients (and potentially in many previously reported cases) was an artifact of the lower imageability of verbs in confrontation naming tasks.

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INTRODUCTION

Neuropsychological research has paid much attention in recent years to apparent dissociations in the categories of words which can be selectively impaired or spared after brain damage. There are two main bodies of literature: one investigates deficits specific to grammatical word classes, such as for function versus content words (see Pulvermuller, 1992, pp. 191–192, for a good summary), or for classes within the content word domain, such as for nouns and verbs, summarized in Berndt, Mitchum, Haendiges, and Sandson (1997). The second describes impairments for specific semantic categories, such as animals versus inanimate objects (Hart, Berndt, and Caramazza, 1985; Hillis & Caramazza, 1991; and see Caramazza, 1998, and Grossman, 1998, for summaries of semantic category deficits). Within both of these areas, the question arises as to whether true category-specific deficits occur or whether the phenomenon can be explained by other confounding variables. In both cases this question has not been satisfactorily resolved: evidence has been presented which supports both explanations.

A number of psycholinguistic variables have been shown to affect word retrieval in aphasia. Low frequency words are generally more difficult to retrieve than high frequency (Ellis, Miller, & Sin, 1983; Howard, Patterson, Franklin, Morton, & Orchard-Lisle, 1984; Kay & Ellis, 1987), although a reverse frequency effect has also been reported (Marshall, Pring, Robson, & Chiat, 1998). Similarly, the number of phonemes or syllables in a word can affect retrieval, with either longer words being harder (Howard et al., 1984) or easier (Best, 1995) to retrieve. Imageability (the ease with which a word produces a mental image) is necessarily correlated with concreteness, but they are not exactly the same thing. Items rated lower in imageability (and hence usually more abstract) are less well retrieved in aphasia (Franklin, Howard, & Patterson, 1995; Nickels & Howard, 1995), but again the reverse effect has been reported both in semantic dementia (Breedin, Saffran, & Coslett, 1994) and aphasia (Marshall, Chiat, Robson, & Pring, 1996).

This paper draws strands of both grammatical and semantic category deficits together in a study of a small case series and suggests that the same phenomenon might account for both types of category effects in aphasia. We make two main assertions. The first is that many reported ‘‘grammatical class-specific deficits’’ are not truly class specific, but the result of the confounding of class with imageability. The second assertion is that ‘‘true’’ word class-specific deficits are in fact due to differences in the distributions of semantic feature types, analogous with the favored explanation of semantic category deficits. We suggest that pictureable objects have a greater weighting of sensory features compared with actions, which are primarily