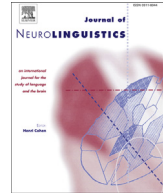




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Preservation of lexical-semantic knowledge of adjectives in the semantic variant of primary progressive aphasia: Implications for theoretical models of semantic memory



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ABSTRACT

Adjectives are lexical words used to modify nouns and refer to physical and concrete properties as well as abstract properties denoted by nouns. Although adjectives directly refer to semantic attributes, no study has explicitly examined the comprehension of adjectives in the semantic variant of primary progressive aphasia (svPPA). In this study, we explored the comprehension of adjectival meaning in four participants with svPPA using two experimental designs assessing the comprehension of adjectives per se and the comprehension of adjectives when associated with concrete nouns. We found evidence that participants: a) were unimpaired on tasks probing knowledge about adjectives referring to dimension and physical properties, to human propensity and value, and to color, but b) showed substantial difficulty when asked to associate the same adjectives with object nouns. These results raise important questions about the lexical-semantic representation of adjectives and, more generally, about the organization of words in the lexical-semantic system. The

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observed difficulties could be due to the impairment in binding different modality-specific properties and combining verbal conceptual knowledge, after anterior temporal lobe atrophy.

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1. Introduction

Most behavioral studies examining lexical-semantic representation have focused on nouns and verbs, which often refer to concrete objects and actions. Adjectives, which also belong to open-class or content words, have received very little attention in psycholinguistic and neurolinguistic studies. In linguistic theories, adjectives are lexical words used to modify nouns and referring to properties denoted by nouns. From a syntactic point of view, adjectives are used to assign to a noun's attribute (e.g., one of the attributes of *elephant* is “dimension”) a particular value (e.g., *heavy*). From a semantic perspective, adjectives also differ from other content words in terms of semantic relationships and organization. Nouns are mainly interconnected by hierarchical hypernym/hyponym, generic/specific and meronymy (part/whole) semantic relationships (Miller, 1990), whilst the relationships between verbs are mainly defined in terms of troponymy (i.e., relationships related to the specificity in manner), entailment, causation and antonymy (Fellbaum, 1990). For adjectives, the lexical-semantic system is organized in terms of antonymy and synonymy relationships (Gross & Miller, 1990). Dixon and Aikhenvald (2004) classified English adjectives according to the type of semantic attribute they denote. As in French, some adjectives refer to physical and concrete attributes of nouns such as “dimension” (e.g., big, small, long), “color” (red, green, etc.), and “physical property” (e.g., soft, heavy, strong, hot). Others refer to more abstract attributes such as “human propensity” (e.g., cruel, generous, proud) or “value” (e.g., nutritious, bad, atrocious).

Evidence for the semantic organization of concepts comes from studies conducted with both normal participants and individuals with brain damage. The study of patients with the semantic variant of primary progressive aphasia (svPPA) (Gorno-Tempini et al., 2011), also known as “semantic dementia”, has contributed to our understanding of the nature and organization of conceptual knowledge in long-term memory. svPPA is one of the clinical forms of frontotemporal dementia, characterized by progressive atrophy of the anterior temporal lobes and degradation of semantic knowledge while other cognitive functions remain largely preserved, at least in the early stages of the disease (Hodges & Patterson, 2007). With respect to language, patients with svPPA usually present with deficits in word production and comprehension but without problems in syntax and phonology. Their performance is affected in all tasks tapping semantic knowledge (e.g., picture naming, word-to-picture matching, semantic questionnaires, semantic judgement on attributes). In most reported studies on grammatical class processing in svPPA (Hoffman, Jones, & Lambon Ralph, 2012; Lambon Ralph, Patterson, Garrard, & Hodges, 2003; Macoir, 2009), the activation of conceptual knowledge was assessed with pictures of concrete objects representing nouns or actions representing verbs. Although some differences between nouns and verbs were observed, these studies show that both types of content words are usually affected in svPPA. To our knowledge, apart from a few studies on specific knowledge about color (Robinson & Ciolotti, 2001; Rogers, Patterson, & Graham, 2007), no study directly examined semantic knowledge of adjectives in svPPA, although adjectives are the verbal referents of semantic attributes. However, in their study conducted in MC, an individual presenting with svPPA, Papagno, Capasso, and Miceli (2009) used experimental tasks with nouns, verbs and adjectives to demonstrate the reversed concreteness effect for nouns only. MC's performance was largely preserved in a semantic judgement task with triplets of concrete and abstract adjectives, as well as with triplets of abstract nouns, while it was very poor on concrete noun triplets. MC also performed poorly on biological items only in a color attribution task in which she was asked to name the canonical color associated with specific concepts. Unfortunately, Papagno et al. (2009) did not specifically discuss the results obtained with adjectives.

Two main theoretical propositions have been put forward to conceptualize the mental representation of the meaning of words: the holistic or non-decompositional view and the feature-based

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