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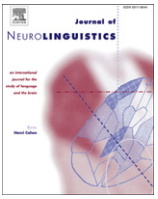

Exploring the semantic category of animals: Some useful indices for a qualitative study of name production and their validation in a patient

Marcella Laiacona [a], Stefania Scotti [b], Nadia Allamano [a], Lorena Lorenzi [a], Erminio Capitani [b,*]

[a] Fondazione S. Maugeri, IRCCS, Istituto Scientifico di Veruno, Neurology Unit, via per Revislate 13, Veruno (Novara), Italy
[b] Università degli Studi di Milano, Neurology Unit, S.Paolo Hospital, via A. Di Rudinì 8, 20142, Milan, Italy

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ABSTRACT

Lexical frequency and item familiarity definitely influence name retrieval in clinical studies, but the relevance of concept typicality has been less extensively investigated. A relevant theoretical question is whether familiarity and typicality exert an independent influence on the name retrieval of aphasic patients. In this study we assembled a list of 288 items of the animals category from a semantic fluency task performed by 198 normal subjects in a previous study. The production frequency of a given animal name was used to estimate typicality, and for the whole list of animals a new normal sample estimated familiarity. The newly collected indices were used to analyse semantic fluency and picture naming of FPA, an anoxic patient. On both tasks, familiarity and typicality were more relevant than word frequency. Typicality of each stimulus, and to a lower degree familiarity, were independently able to predict the type of naming response. Thus, the influence of lexical-semantic variables on naming should be viewed, at least in this case, as something endowed with two dimensions (typicality and familiarity), while in other cases also lexical frequency may be relevant.

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* Corresponding author. Tel.: +39 02 50323151.
E-mail addresses: marcella.laiacona@fsm.it (M. Laiacona), erminio.capitani@unimi.it (E. Capitani).

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1. Introduction

Name retrieval is commonly assessed by means of picture naming or verbal fluency tasks. On picture naming, subjects are simply requested to retrieve the name corresponding to the picture. On verbal fluency tasks, subjects are requested to produce all the names belonging to a given domain that come to mind within a brief fixed span of time, using as a cue a semantic category (for instance "animals") or the initial letter of the word. On semantic fluency, clinicians and researchers feel it necessary today to go beyond the mere count of how many correct words are retrieved and consider what the actual characteristics of the responses are. One may rate the lexical frequency of the retrieved words, the familiarity with the corresponding objects, or the relatedness between successively produced words, etc., and so compare these variables between patients and controls. Also on picture naming, one may follow a finer-grained approach and contrast word frequency or item familiarity of correct and wrong responses. The choice of the stimulus category on semantic fluency and picture naming may influence the patient's performance, because some categories are easier for males or females and because, in the case of semantic fluency, the assigned category can be very large or more restricted. Therefore, categories that are not influenced by sex and that include many exemplars may be preferred for clinical use. In particular, in semantic fluency task a large category with many frequent and familiar items might avoid a floor effect in the study of neurological patients. In this respect, a well suited category is "animals", because it does not present a sex asymmetry and certainly includes a huge number of items (Capitani, Laiacona, & Barbarotto, 1999). The influence of word frequency is one of strongest effects detected in psycholinguistic and neuro-linguistic research. Most authors concur that the frequency effect is centred on the lexicon, although it is not certain whether the locus of frequency effect is single or multiple. Candidate stages, in fact, are the semantic-lexical connections, the lexical representations and even the lexical-segmental connections (for a discussion see Knobel, Finkbeiner, & Caramazza, 2008). The lexical frequency effect could be concentrated in one of the above stages, or it could be distributed throughout all of them.

Precise values of lexical frequency are available from a number of sources: for Italian, standard references are De Mauro, Mancini, Vedovelli, and Voghera (1993) for spoken frequency and Bortolini, Tagliavini, and Zampolli (1972) or Bertinetto et al. (2005) for written frequency. These indices derive from a corpus that extends from 500,000 words (De Mauro et al., 1993 and Bortolini et al., 1972) to 3,150,075 (Bertinetto et al., 2005) words, and even with such sample sizes most low-frequency items escape inclusion and are simply assigned a frequency of zero. Notwithstanding this limit, the frequency of every animal item can be rated, even on a left-closed scale. We did not consider in this study the role of the age of acquisition of a name, because a *direct* observation of this variable for each item of a very large category such as "animals" was not feasible within the scope of the study and the indirect estimation of acquisition age, most commonly used in practice, is closely related to object familiarity and is therefore a less specific predictor (Barbarotto, Laiacona, & Capitani, 2005; for a different position, however, see for instance Lotto, Surian, & Job, 2010).

The specific role played by object familiarity and concept typicality, and their interdependence, are a complex matter. Many clinical studies have shown that tasks are performed better when the stimulus is well familiar to the examined subject. For instance, in JBR, a classic case of a category-specific disorder for living things reported by Warrington and Shallice (1984), the ability to name and define living and non-living things deteriorated with decreasing levels of familiarity (Funnell & De Mornay Davies, 1996). For a recent example of the familiarity-specific relevance and a discussion of the familiarity role, see also Cuetos, Rosci, Laiacona, and Capitani (2008). Whereas the word frequency effect is probably rather specific for the lexical representations, concept familiarity effect is likely to encompass a wider scope of representations and processes: the more often an object or entity is encountered, or even thought of, the stronger becomes the corresponding concept. Familiarity ratings in normal subjects were reported for a set of 260 items from different categories by Snodgrass and Vanderwart (1980) and for the Italian language by Nisi, Longoni, and Snodgrass (2000). Albanese, Capitani, Barbarotto, and Laiacona (2000) estimated different facets of familiarity for a set of 80 items (10 per category for 8 categories) belonging to the Snodgrass and Vanderwart set, and Reverberi, Capitani, and Laiacona (2004) exhaustively estimated item familiarity for the whole category of fruit.

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