



# Naming deficit for non-living items: Neuropsychological and PET study

MARIA CATERINA SILVERI,\*§ GUIDO GAINOTTI,\* DANIELA PERANI,‡  
JEE YUN CAPPELLETTI,‡ GABRIELE CARBONE† and FERRUCCIO FAZIO‡

\*Institute of Neurology, Catholic University, Rome, Italy; †Israelite Hospital, Rome, Italy;  
‡INB-CNR, University of Milan, Scientific Institute H San Raffaele, Milan, Italy

(Received 20 March 1996; accepted 6 August 1996)

**Abstract**—We report a patient with progressive left hemisphere atrophy who presented a lexical retrieval deficit more pronounced in naming non-living items than in naming living items. Word frequency and familiarity strongly influenced the performance, but the dissociation persisted when the items were controlled for these factors. In addition, the prevalent deficit for non-living items in respect to living items could be confirmed in tasks where other patients presented the opposite pattern. A PET study showed a significant hypometabolism in the left hemisphere regions suggesting that, at variance with living deficit which is observed in patients with bilateral lesions, non-living deficit is produced by unilateral left hemispheric lesions. This patient confirms that living and non-living categories may dissociate and that distinct neural systems subsume their knowledge. © 1997 Elsevier Science Ltd. All rights reserved.

**Key Words:** anomia; category-specific deficit; PET.

## Introduction

Instances of patients with selective impairment for semantic categories in naming and in visual identification have been repeatedly reported. The vast majority of these observations concerns patients with a prevalent deficit for natural biological categories in respect to artefactual objects [1, 7, 8, 24, 28, 30, 32]. Different hypotheses have been put forward to explain this dissociation: the visual similarity among components of natural categories that makes them difficult to discriminate [26]; a loss of structural knowledge critical to distinguish natural items in respect to artefactual items which could be better defined on the basis of functional attributes [1, 7, 28, 30, 39]; the categorical organisation of the lexicon [15].

Recently, the genuineness of this dissociation has been put under discussion. The prevalent impairment of natural categories has been considered as a spurious effect due to the fact that natural items belong to lower range of familiarity or name frequency or have a higher visual complexity in respect to artefacts [13, 34].

However, the hypothesis of a category specific sem-

antic impairment for living items is still tenable for two main reasons: the prevalent impairment for natural items may persist when conjoint effects of visual familiarity, visual complexity and name frequency are controlled [9, 14, 29] and when the experimental design has sufficient power [10]; the selective category impairment has also been described, albeit less frequently, for categories of artefacts [2, 16, 27, 37, 38].

It has to be acknowledged however, that, in spite of the efforts made by various authors, it is virtually impossible to rule out all the possible biases due to stimulus selection. For example, Parkin and Stewart [21] are not fully convinced of the stimuli selected by Sartori *et al.* [29]. Although controlled along many variables, the sets of stimuli for living and non-living items selected by these authors may not be matched for featural overlap since living items shared more common features than non-living items, thus resulting to be more difficult to discriminate than non-living items.

The existence of patients with a prevalent impairment for non-living items is more compelling in confirming a selective category deficit, since it demonstrates that the dissociation between living and non-living deficit is a double one, and even more convincing is the demonstration that the double dissociation between living and non-living may be obtained with the same set of

§Address for correspondence: Institute of Neurology, Catholic University, Largo A. Gemelli, 8, 00168, Roma, Italy.

stimuli [16] ruling out any bias due to the stimulus selection.

Patients with a prevalent impairment for non-living items are quite rare. Warrington and McCarthy [37] described a patient who presented residual verbal comprehension for objects; food, animals and flowers were relatively preserved. The same authors [38] described a second patient with poor verbal comprehension of objects as compared to food and living things and among objects, a more severe deficit for small, manipulable objects as compared to large objects. Further evidence is provided by Hillis and Caramazza [16] and by Sacchett and Humphreys [27] who described patients with a prevalent deficit for artefacts in naming and in word–picture matching tasks.

Independent evidence in support of the genuineness of a selective categorical deficit for living and non-living items comes from the observation that deficits for the former or the latter categories are likely to be related to different lesion sites in the brain. Patients with prevalent impairments for living things have bilateral inferior temporal lesions (see [14] for discussion), while prevalent impairment for non-living items are usually produced by ischaemic lesion involving the territory of the left middle cerebral artery [27, 37, 38].

A recent PET activation experiment confirms these neuropathological data and suggests the segregation of neural substrates involved in the recognition of living and non-living items [23]. In this study the authors measured the cerebral blood flow in normal subjects while they were deciding if pairs of visual stimuli were or were not different representations of the same animal or object. They showed that the recognition of animals activated the posterior temporo-occipital regions of the brain bilaterally, while the recognition of artefacts engaged a left hemisphere network, involving also the left dorsolateral frontal cortex.

To summarise, we consider the available experimental evidence sufficient to confirm that the categorical dissociation between living and non-living items is genuine and may be subserved by brain structures involved in the processing of various kinds of information. However, we are aware of the possibility that aspecific factors, such as word frequency, familiarity and visual complexity, may contribute to producing or potentiating category dissociation.

In this paper we describe a patient with a progressive focal left hemisphere atrophy, and a progressive pure naming deficit, prevalent for non-living items. This patient was requested to name items belonging to categories of living and non-living items, controlled for the above-mentioned variables that are known to influence performance. Among various tasks, particularly relevant was the administration of the naming tasks devised by Sartori *et al.* [28] and Gainotti and Silveri [14], respectively, to explore in their patients the selective deficit for living items. This was to demonstrate, with the same set of stimuli, a double dissociation between living and non-living categories. The patient also underwent a [18F]FDG

PET study in order to evaluate the functional metabolic correlation.

### Case report

CG is a 66-year-old, right-handed man with a degree in pharmacy who, late in 1992, began to complain of word finding difficulties. A first neurological examination performed at the Israelite Hospital in Rome, confirmed the presence of a mild anomia, in the absence of other cognitive deficits. The physical examination was completely negative. A first MRI evidenced a left temporal polar atrophy. The patient was admitted in the Neuropsychology Service of the Catholic University on April 1993. He was fully oriented in time and in place and extremely cooperative. The neurological examination was negative. He was 29/30 correct on Mini Mental State. Speech was entirely normal except for occasional word finding difficulties for low-frequency words. He performed within normal range on tasks exploring intelligence (Raven Coloured Matrices: 31/36), spatial exploration abilities (maximum in accuracy in simple and double cancellation tasks), limb, oral and constructional apraxia, verbal memory (immediate and delayed free recall of words—immediate vs delayed recall: 46/75 vs 10/15), visual memory (recognition of previously presented pictures: accuracy = 98%) frontal abilities (letter word fluency: 39 on 3 letters; Temporal Rule Induction: 3/3 correct). IQ was 112. On a screening aphasia battery (Batteria per lo studio dei deficit afasici [20]) the patient's performance was entirely normal (100%) on spoken and written word–picture matching, spoken and written complex sentence comprehension, syllables discrimination, reading, writing and repetition of word and non-word. Performance on lexical decision tasks (the patient is requested to say if a legal string of letters is or is not a word) was normal as well, both on spoken and written stimuli. On the contrary, a mild anomia was observed in all naming tasks. It had the following characteristics: names of inanimate objects more impaired than names of animate objects; object names more impaired than action names. Difficulties in naming proper names was also observed. This last deficit will be discussed in a companion paper [31]. Only the first dissociation will be extensively discussed here. As for the greater impairment of objects as compared to actions, this discrepancy was observed both in oral and in written modalities (objects: oral naming vs written naming: 19/28–68% vs 15/22–68% correct; actions: oral naming vs written naming: 23/28–82% vs 20/22–91% correct). The patient was tested over a period of 2 years during which it was possible to document a progressive worsening of naming abilities, and the full preservation of the other linguistic skills. Non-linguistic abilities also remained entirely normal. On October 1994 he was submitted to a PET study and a MRI scan at the Institute H. San Raffaele, Milan. The latter showed an atrophy of the left inferior parietal lobule. The left 'temporal polar atrophy' described in the

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات