Naming of Nouns and Verbs in Aphasia:
Preliminary results of a word retrieval task in a sentence context

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INTRODUCTION

Several authors described cases of dissociated impairment in naming nouns and verbs. There are four main accounts of this dissociation: (i) patients may have purely lexical damage which selectively affects verbs or nouns at a late stage of the linguistic processing (phonological or orthographic lexicons) (Rapp & Caramazza, 2002); (ii) the damage affects a lexical device, either at an ortographic-phonological modality-specific level or at a unitary lexical-syntactic level (Levelt et al., 1999; Berndt et al., 1997); (iii) N-V dissociation is not a lexical but a semantic phenomenon (Bird, Howard & Franklin, 2000); (iv) N-V dissociation is due to syntactic damages (Friedmann & Grodzinsky, 2000).

To disentangle imageability and grammatical class effects, a new task was developed that allowed to elicit Ns and Vs in a sentence context. The results obtained will permit to address the following three questions: Does *imageability* play a role in determining N-V

dissociation? If so, is imageability the *unique cause* of dissociation? If there is additional damage, *at which level* of linguistic processing does it take place?

METHODS

Twelve Italian aphasic patients and 11 normal controls participated in the study.

Nouns and Verbs Retrieval in a Sentence Context (NVR-SC). Fourty-five pairs of sentences denoting the same event, either using a noun or the corresponding verb (e.g. *the evasion/to evade*) were used. The first sentence was presented in complete form, while a gap was left in the second sentence, to be completed with the target word. For each pair of sentences two different conditions were employed, one triggering a verb and one triggering a noun.

E.g. **V→N:** The prisoners was dreaming to *evade*

The prisoners was dreaming the ……

N→V: The prisoners was dreaming the *evasion*

The prisoners was dreaming to ……

The performance in the *NVR-SC task* was compared to that obtained on a classic *picture naming task* eliciting nouns and verbs.

Statistical methods: Logistic regression analysis (LRA) was applied to the profiles of the patients, making it possible to study the effects of the lexical-semantic variables in univariate and multivariate linear models.

RESULTS

Picture naming task

All patients with predominant verb deficit also have an imageability effect. Moreover, in 8 patients the grammatical class effect was no longer significant after introducing imageability in the statistical analysis (*bivariate LRA*).

NVR-SC task

Two of the verb-impaired patients in the *picture naming task* maintained a predominant verb deficit also in the *NVR-SC task*. In eight patients, the difference between nouns and verbs was no longer significant. In two patients, a paradoxical dissociation (V>N) emerged.

Group analysis: performance on nouns and verbs across naming tasks (Figure 1)

Patients named actions in the *NVR-SC task* better than in the *picture naming task* (58% correct versus 37%; $p<.001$). On the contrary, the naming of objects in the *picture naming task* was better than in the *NVR-SC task* (76% versus 61%; $p<.05$).

DISCUSSION

Imageability effect is highly associated with noun-superiority. This result may have several explanations.

(a) When left hemisphere language areas are completely damaged, a naming system located in the right hemisphere is used. Its capacity is limited to high-frequency concrete nouns (Zaidel, 1990).

(b) A lexical damage to verbs involves the argument structure, since it is the core of the verb representation. Aphasic patients use a compensatory strategy, probably relying on visual representations of actions. In fact, the thematic grid may be inferred from a mental image. The effectiveness of the compensatory strategy increases in relation to imageability (Luzzatti & Chierchia, 2002).

(c) Since nouns are generally more imaginable than verbs, the imageability effect may cause noun-superiority. But, imageability alone cannot completely account for predominant verb impairment. In fact, four patients have predominant verb impairment even when imageability has been partialled out (bivariate LRA) and two patients are still dissociated in the *NVR-SC task* (where imageability of nouns and verbs was perfectly matched).

Therefore, additional damage must be hypothesized, accounting moreover for the fact that nouns are named better in the picture naming task, and verbs in the NVR-SC task. These results may only be explained by hypothesizing an additional damage to a central, lexical-syntactic level (i.e. the lemma); in fact, this is the only way to account not only for the better performance on verbs in the *NVR-SC task*, but also for the fact that nouns are named better in the *picture naming task*.

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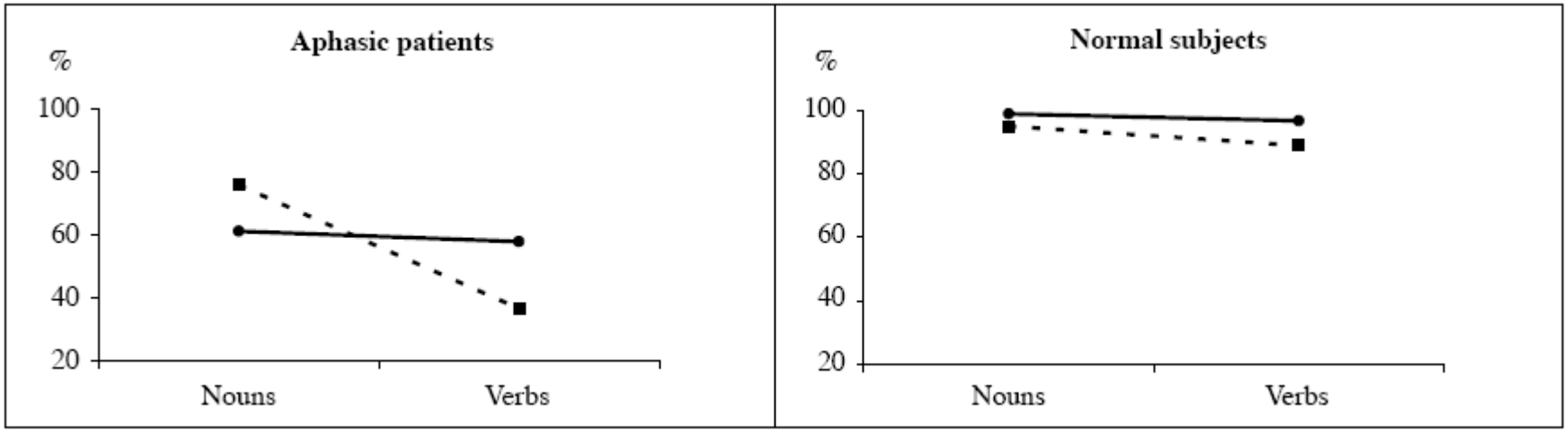

Figure 1: Percentage of correct responses in the Picture Naming Task (dashed line) and in the Noun and Verb Retrieval in a Sentence Context task (full line).