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Proper name anomia: A case with sparing of the first-letter knowledge

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Abstract—In this article we describe the case of GC, a woman affected by severe proper name anomia due to progressive brain atrophy that mainly affected the left temporal pole. Proper name comprehension and semantic knowledge about the people she was unable to name were normal. GC showed a sparing of initial letter knowledge of proper names, while other phonological characteristics were not equally available.

At a later stage of her illness, the naming impairment began to affect common names as well as proper names, though at a lesser extent. Whereas there was no category effect between names of animate and inanimate stimuli, we observed a relative sparing of first letter knowledge selectively for animate categories, although less marked than with proper names.

This case is discussed within the theoretical framework of two-stage models of name production. Knowledge of the initial letter of proper names supports the psychological reality of the "phonological address" as a preliminary stage of the production of this class of names. Moreover, the qualitative similarity between errors observed with proper names and with names of animate objects suggests that the production of names belonging to these classes may conform, at least in part, to analogous algorithms. © 1998 Elsevier Science Ltd. All rights reserved.

Key Words: phonological lexical representations; category specificity; progressive temporal atrophy.

Introduction

Patients affected by proper name anomia show a specific and consistent neuropsychological profile: they retain semantic information about people, but cannot retrieve the phonological form of their names. This category-specific disorder also participates in a double dissociation: selective preservation of proper names has been described by McKenna and Warrington [20], Semenza and Sgaramella [28] and restricted to the written modality by Cipolotti *et al*. [8]. This would rule out the hypothesis of an intrinsic difficulty associated with proper names. Hypotheses advanced to interpret proper name anomia have taken into account the special locus of proper names in the linguistic scenario [15, 11]. Proper names are considered "purely referring expressions" without implying any properties or attributes. A special vulnerability would therefore ensue from the "arbitrary link" between people and their names, despite the presence of the double dissociation noted above.

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The role played by the initial segment of a name is relevant both from the clinical and the theoretical perspective. In a clinical survey, Goodglass *et al*. [14] found that, for a certain percentage of the names that aphasics could not produce, there was sparing of first letter knowledge; this occurred more frequently in conduction aphasics (about 30%) than in Wernicke's and anomic aphasics. On the other hand, the "tip-of-the-tongue" phenomenon, observed also with normals, has been the subject of several inquiries [4]. "Tip of the tongue" affects proper names much more often than common names and first letter knowledge is often available to the subject during this transient word retrieval impairment.

Still from a clinical perspective, a classical facilitation technique in naming rehabilitation is to furnish the first phoneme of a name. Semenza and Sgaramella [28] described a patient, RI, affected by a severe deficit of language production and naming: he showed successful proper name retrieval only when given the first sound of the name as a cue. Semenza and Sgaramella suggested that phonemic cueing would be selectively more efficient (or even "sufficient") to foster proper name retrieval, in this case because the relationship between name and reference is very straightforward ("one-to-one").

Beyond the case of proper names, other theoretical approaches may also be relevant for a general interpret-

ation of the role of the first segment in name retrieval. Both clinical studies and the errors observed in normals have provided evidence for current models of name production, as discussed by Howard [16]. We will concentrate here on the two-stage model of name production [18, 5], in particular Butterworth's model [5], as it gives a definite role to the first segment of a word. This model hypothesizes the existence of two separate loci where the information necessary for word production is stored: a "semantic lexicon" and a "phonological lexicon". Whereas the latter contains the explicit phonological form of the word, the former consists of semantic entries plus some fragments of the phonological structure of each word (the "phonological address") necessary for retrieving the appropriate representation in the phonological lexicon. The information contained in this "address" would include the first segment, the number of syllables, and the stress pattern of each word. According to Butterworth [5], the "address" can yield partial information about the phonological form of the word when the full phonological form is not accessible or is destroyed. Some case descriptions seem to add clinical evidence to the hypotheses reported above. For instance, the patient EST, described by Kay and Ellis [17] presented with relatively spared comprehension but a naming deficit due to a left hemisphere neoplasia. In many cases, this patient appeared to know little or nothing of the target name. A phonemic cue did not significantly enhance the retrieval of the full phonological form, but frequently facilitated the production of some phonological information. In other cases the patient could spontaneously retrieve partial phonological information but not the whole form. Unfortunately, the status of proper names was not extensively examined in this patient.

In this article we describe the case of GC, a further patient affected by severe proper name anomia. The interest of this case is that, besides an almost complete sparing of semantic information, GC also showed preservation of knowledge of the initial letter of the names she was unable to retrieve: this acquired a special salience in her naming attempts. Her naming deficit was initially confined to proper names, but later involved also common names.

Materials and methods

Clinical history

GC is a 59 year old right-handed woman, with 5 years of education, who suffered a progressive difficulty in retrieving proper names, including those of her relatives. She was firstly considered "anxious" by her doctor, who put her on benzodiazepines, but the patient refused that diagnosis and was later seen by a neurologist. On neurological examination, GC did not show any pathological signs, but a SPECT-scan showed left temporal hypoperfusion. One year after onset of symptoms, she was referred to us for neuropsychological evaluation.

Neuroradiological findings

In September 1995 a CT-scan showed mild atrophy, while SPECT revealed hypoperfusion in the left fronto-temporo-parietal region and MRI disclosed marked left temporal atrophy. SPECT and MRI were repeated in May 1996. The hypoperfusion affected the same areas but was more severe with respect to the previous examination. The atrophy observed on MRI was definitely more severe than 8 months before. It affected the whole left temporal lobe and was progressively less severe from the temporal pole (most affected) to the posterior end of the lobe (least affected). In the posterior left temporal regions there was only a slight difference with respect to the contralateral structures (Fig. 1). The atrophy affected both neocortical and limbic cortex, with enlarged temporal horn of the lateral ventricle.

Neuropsychological examination

Mental deterioration was excluded by means of MODA [3] and Raven's Coloured Progressive Matrices. Memory was assessed by means of digit and block tapping span [24], word list recall [22] and supra-span block-tapping learning [7]. Perceptual abilities were checked by means of Benton's Line Orientation and Face Recognition tests [2]; prosopagnosia was excluded using a test of Face Familiarity and of Famous Face Identification [13].

To check the ability to visually identify famous people, we submitted the patient to a test including 50 famous people's pictures randomly intermingled with 50 unknown people's pictures. GC was asked to recognize the famous ones and give their names.

Naming was more extensively investigated, both for common and proper names, and methods will be described later. As long as object naming was normal, it was assessed by means of an Object Naming and a Naming to Description Test [23]; when the patient's scores became pathological, naming was investigated by means of the picture naming section of the Semantic Memory Battery of Capitani *et al*. [6], based on 60 items of the Snodgrass and Vanderwart set: 30 belonging to living categories (animals, fruit and vegetables) and 30 to non-living categories (tools, vehicles and furniture). Besides picture naming, we also gave the other sections of the battery, i.e. a word-picture matching test with alternatives from the same category and from different categories and a semantic memory questionnaire. Of the 6 questions related to each stimulus, two concern superordinate information, two perceptual subordinate and two associative subordinate information (examples are given in [6]). GC was also given the BORB [26].

In order to check the status of her knowledge without the use of visual stimuli, we gave GC a fame decision test on famous names; with famous people, semantic information was then requested with a multiple choice verbal questionnaire. Additionally, verbal fluency for proper and common names was assessed. For each category, the time limit was 1 min.

Statistical methods

In order to classify the nature of GC's naming deficit more precisely, we analysed the test–retest consistency of her performance. The agreement analysis according to Cohen's k coefficient, widely used in the past, has been recently criticised [12]. Faglioni and Botti introduced the analysis of stochastic models based on Markov chains as a better instrument for distinguishing storage from retrieval deficits. In this study we will follow their three-parameter model, that allows estimates