



Anomia for people names in DAT—evidence for semantic and post-semantic impairments

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Abstract

Proper name anomia is a frequent finding among patients in the early stages of Alzheimer's disease. The present study investigates naming of famous persons in a group of DAT patients, a group of persons with mild cognitive impairment (MCI) and healthy controls. The study is aimed at distinguishing the relative contributions of semantic and post-semantic factors to difficulties in proper name retrieval. As shown by a significantly lower score in answering semantic questions, DAT patients retrieve less biographical knowledge related to famous persons than healthy elderly subjects and persons with mild cognitive impairment. This finding is in line with the frequent observation of semantic deficits in early and moderate DAT. The high number of Tip-of-the-Tongue (TOT) answers in DAT found in relation to few spontaneously named items shows that post-semantic deficits are as important as semantic deficits in determining anomia for people names in DAT. Moreover, DAT patients were less sensitive to phonological cueing than healthy persons or persons with mild cognitive impairment. These findings suggest that proper name anomia in DAT is not only due to semantic deficits, but also to problems in accessing the phonological representation, as well as to a degradation of phonological representations. Thus, naming deficits in DAT differ not only quantitatively, but also qualitatively from the difficulties of healthy elderly persons. No significant differences were found between persons with mild cognitive impairment and healthy controls in proper name retrieval.

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1. Introduction

Difficulty in retrieving names of people is a frequent finding among patients in the early stages of Alzheimer's disease (Perry & Hodges, 1996; Hodges, & Salmon, & Butters, 1993; Greene & Hodges, 1996; Semenza, 1997; Yasuda, Nakamura, & Beckman, 2000). Indeed, it seems to be already present at a stage where according to the standard criteria (NINCDS-ADRDA; (McKkann et al., 1984)), a diagnosis of DAT is still far from being safe. A longitudinal study on subjects suspected of DAT (Semenza, Borgo, Mondini, Pasini, & Sgaramella, *in press*) showed, for example, that simple tests requiring people names retrieval could effectively discriminate between those patients who eventually developed DAT and subjects who would instead receive other diagnoses (such as pseudodementia, vascular dementia, etc.) at the time where even extensive batteries for dementia screening (e.g. MODA (Brazelli, Capitani, Della Sala, Spinnler, & Zuffi, 1994)) could not.

Anomia for people names is thus an early and therefore a very important symptom of DAT. Indeed, it may be considered as a pathological increment of a phenomenon that belongs otherwise to the intrinsic characteristics of human memory and the physiological changes it undergoes with age. In fact, a widespread literature documents word finding difficulties with increasing age and it is widely accepted that proper names (of which people names are the best studied) are not only intrinsically more difficult to retrieve but also disproportionately sensitive to the age factor. Although experimental support for this view is surprisingly little and only recently produced (Cohen & Burke, 1993; Nicholas, Barth, Obler, Au, & Albert, 1997; Semenza, Nichelli, & Gamboz, 1996), it can now be safely claimed that (a) proper names are generally at disadvantage with respect to common names, (b) this disadvantage becomes larger with the age of 70, and, finally (c) in DAT the age-related disadvantage of proper names is dramatically pronounced.

The nature of the proper name deficit found in DAT remains, however, to be fully investigated. While in studies with patients after focal lesions the importance of lexical activation has been stressed (Semenza & Zettin, 1988;

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Semenza & Zettin, 1989; Semenza, Zettin, & Borgo, 1998), proper name anomia in DAT would reflect primarily a loss of stored semantic knowledge about the identity of familiar people (Della Sala, 1995). This may not, though, be the whole explanation. In the particular case of DAT, other post-semantic deficits, as, for example phonological degradation, may contribute as well to proper names anomia—in which proportion remains to be established.

The present study is aimed at distinguishing the relative contributions of semantic and post-semantic factors. Semantic knowledge is tested by specific questions regarding biographic information of famous persons. The contribution of post-semantic factors is estimated by the analysis of the frequently observed Tip-of-the-Tongue (TOT) phenomenon and its sensitivity to phonological cueing. A TOT word is in the lexicon of a speaker, but is temporarily inaccessible (e.g. (Burke, MacKay, Worthley, & Wade, 1991)). Better knowledge of the processing stages at which people name anomia arises may dictate better intervention strategies to cope with a socially very embarrassing symptom. With respect to previous studies post-semantic stages will be more thoroughly investigated. The issue will also be addressed whether anomia for proper names in DAT represents indeed a quantitative increment of age-related memory changes or has qualitative differences as well.

2. Methods

2.1. Patients

Patients were outpatients who were consecutively recruited from the Memory Clinic of the Clinic of Neurology, Innsbruck, to which they were referred because of memory problems. They were evaluated prospectively using standard neurological and neuropsychological test procedures. Nineteen patients (15 females, 4 males) were diagnosed as having Alzheimer's disease (DAT) according to NINCDS-ADRDA criteria (McKkann et al., 1984). DAT patients reportedly had problems with memory in combination with variable other cognitive impairments, mostly comprising language (naming, comprehension), executive functions, visuoperception or constructive abilities. Additional investigations included an informal interview, CT or MRI of the brain, routine blood samples, and, when necessary, SPECT, EEG and other diagnostic procedures. DAT patients' mean age was 73.42 years (S.D. 8.55) and they had an average educational level (8–10 years). Mean estimated disease duration in the DAT group was 2 years and the mean MMSE score was 20.05 (S.D. 4.6, range 10–27). The second patient group included 24 subjects (14 female, 10 male) with mild cognitive impairment (MCI). Twenty-one out of 24 subjects had an average educational level, three subjects an above average education. Performance of these three subjects did not differ from the group with average education with respect to neuropsychological background tests or experi-

mental tasks. MCI patients' mean MMSE score was 27.58 (S.D. 1.67, range 24–30) and did not differ significantly from controls. MCI was diagnosed according to standard criteria (Petersen et al., 1999) and was defined as a state of acquired, isolated mild memory impairment appearing with age, which is not accompanied by dementia or impairments in other cognitive domains. Patients with MCI typically complained about everyday memory problems during the past 6–12 months regarding the recollection of recent events or currently perceived information, but also problems with appointments, phone numbers, peoples' names, or misplacement of objects. DAT and MCI patients had no history of substance abuse and no concomitant major neurological, psychiatric or medical disease. To control for the effects of depression, patients of both groups with a high score in depression screening (score >17; Geriatric Depression Scale (GDS); (Yesavage et al., 1983)) were not included in the study. Neuropsychological test sessions lasted 90–120 min. If patients appeared tired during testing, the session was ended and continued after a break. All patients had normal or corrected-to-normal vision and sufficient hearing ability.

2.1.1. Control subjects

Twenty healthy elderly subjects (12 female, 8 male), mean age 72.80 years (S.D. 8) participated in the study. All subjects volunteering for this investigation were free of neurological or psychiatric medical history and had normal or corrected-to-normal sight. Seventeen out of 20 controls had an average educational level, three subjects an above-average education. Performance of these subjects did not differ from the group with average education. Controls' mean score in the MMSE was 28.15 (S.D. 1.23, range 26–30). Comparing age no significant differences were found between patient groups and controls. Patients and controls came from the same geographic region and were exposed to the same media (TV, newspapers etc, ...) over the last years.

2.1.2. Neuropsychological background tasks

All subjects performed the MMSE (Folstein, Folstein, & McHugh, 1975) and the CERAD battery (Rosen, Mons, & Davis, 1984), including object naming, verbal memory (learning, recall, recognition), constructive abilities (copying shapes) and visual memory (reproduction of shapes). Fluency tasks assessed phonological fluency (S-words in 2 min) and the generation of names (names in 2 min). In order to assess visuo-spatial abilities a subtest of the VOSP battery (number location (Warrington & James, 1991)) was administered. Finally, a short test of verbal intelligence (VKI (Anger, Mertesdorf, Wegner, & Wülfing, 1971)) was given to all subjects. In addition to these tests patient groups, but not controls, performed further tasks. Constructive and planning abilities were assessed in the first part of the CLOX Test (Sunderland, Hill, & Mellow, 1989) while the second part examines copying abilities only. Psychomotor speed and mental flexibility were measured in the Trail Making Test, part A (Lezak, 1998). A verbal

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