

The neurobiology of naming: on proper and common name anomia

Summary

This book is devoted to the phenomenon of how the human mind searches for proper and common names, and also to describing the neurobiological mechanisms related to this complex mechanism, which reveal themselves in various types of damage to both hemispheres and as part of primary progressive aphasia.

This book focuses on the relationship between proper name and common name anomia, and the degree and scope of these two partly independent phenomena. It combines the neurolinguistic perspective with the linguistic and (onomastics) psychological (cognitive). It also connects the theoretical aspects with conclusions based on the author's own research on language disorders in patients with various types of anomia. These conclusions are the result of long-term experimental research conducted between 2011-2016 on patients at the Department of Neurology and Cerebrovascular Disorders at Poznan University of Medical Sciences Bierkows-ki Hospital.

The book is composed of six chapters, an introduction and a conclusion. Apart from the main body of the paper, there is also an extensive additional part which includes the bibliography, glossary of terminology used in the paper (neurobiological, medical, psycholinguistic, linguistic and onomastic), the list of abbreviations, tables and figures. The paper also includes an annex comprising a list of proper and common names used in the particular subtests. The subject index contains terminology from the field of speech and language pathology, psycholinguistics and onomastics.

The introduction presents the structure of the paper, its aims and the phenomenon of double dissociation between proper and common names. Chapter one (*Naming*) provides an overview of concepts related to the specific character of the proper name system and the meaning of proper names. Special attention is paid to the problem of denotation and connotation, differences between proper and common names (from the linguistic and neuropsychological perspective), an explanation of the greater difficulty found in searching in the mental lexicon for synonyms

than appellatives. Numerous publications in psychology and neurobiology are cited and discussed here. These deal with different proper name models which attempt to explain the more difficult access to this part of the mental lexicon. The neuro-anatomy of searching for proper and common names is also presented together with reasons that at least partly explain why these two groups of nouns are processed independently by the brain. The chapter finishes with an explanation of the methodological assumptions of this book. It discusses the principles for preparing a naming test and its structure.

The second chapter presents the phenomenon of naming impairment, i.e. anomia, and its various types, as well as various ways of compensating for these kinds of cognitive deficits. This part is intended by the author to act as a quick reference for speech and language pathologists, a way of putting in order the quite imprecise terminology that has been used in both Polish and international aphasiology literature. The final part of this chapter contains an analysis of the results obtained in confrontation naming of proper and common nouns by a control group comprising people without neurological disorders. Mistakes that were made by control group members were analysed using the classification of adaptive-compensation techniques put forward in this book. The range of incorrect answers is quite limited, and in the case of common names it is related to perception errors, whereas when it comes to proper names they take the form of circumlocutions or omissions.

The aim of further observations, which are discussed in the next three chapters of this book, is to evaluate erroneous naming (confrontational) by people with neurological disorders. This is at the same time an attempt to outline the architecture of the mental lexicon of proper and common names, i.e. two lexical classes which differ at least partly in their neurological representation, which is much harder to observe in people without any impairment. Each of the next three chapters opens with a theoretical introduction on disorders of a linguistic, cognitive and perceptual nature experienced by people with post-stroke and progressive aphasia, as well as those with Right Hemisphere Syndrome. In this section speech and language pathologists can find useful information on how to study patients with anomia, types of aphasia, and also characteristics of Right Hemisphere Communication Syndrome and types of PPA.

Chapter three, titled *Left Hemisphere Anomia*, discusses the results of the research with 56 patients with aphasia, i.e. with damage to the left hemisphere. People selected for this research were, in particular, those in the first phase of the disease, i.e. directly post-stroke, with naming impairment, i.e. anomic aphasia and aphasic anomia. Compensation techniques observed in the proper and common name category are different in terms of quantity but the range of mistakes that occur is the same. Irrespective of differences of a quantitative nature, the configuration of the naming mistakes discussed here proves the relationship between cortex and deep structures with semantic processing. It also supports the stronger correlation with linguistic knowledge rather than extralinguistic in the compensation process in

appellative anomia, in other words, it points to a significantly greater opportunity in searching for the knowledge about the sign.

Such a correlation cannot be observed in the case of proper names, which are substituted most frequently through references to extralinguistic knowledge (dominance of circumlocutions). The next most frequently used technique is references to linguistic knowledge in the form of: a) another element of a particular semantic category (semantic paraphasias); b) a different element of a broadly understood category of proper names in general (unrelated words, lexical errors). It is easier to substitute a proper name with the knowledge about its object rather than through references to a sign. Although in proper name anomia it is possible to observe “sign” compensations, they are less numerous. A kind of disproportion can be noticed in using particular alternative ways of referring to people (proper name anomia) and as a consequence it is possible to distinguish between cortical and subcortical aphasia. This is a clear case of two different error patterns: the first type dominates in aphasias caused by damage to the cortex (semantic paraphasias), while the other type is most frequent in lesions in deep structure (unrelated words, lexical errors). The images of anomia that arise from the presentation in this chapter point to various fragments of a complex process of naming. A further contribution to this view is provided by the chapter devoted to selective anomia of the semantic and modal type. It finishes with a case study of a person with proper name sparing in the visual modality (recognition of the written form of proper names).

The fourth chapter (*Right Hemisphere Anomia*) is an account of an observation of anomia in 24 patients with damage to the right hemisphere as a result of stroke. It contains important information concerning the characteristics of a patient with Right Hemisphere Syndrome. On the basis of the literature and experimental observation, this part of the publication discusses the following: perceptual disorders (vision disorder, hemispatial neglect), reading and writing disorder, attention, communication skill and prosodic disorders, and also a deficiency in speaking fluency. The other part of the chapter is devoted to the analysis of naming tests that the participants of the research underwent. Right Hemisphere Anomia is different to naming impairment after damage to the opposite hemisphere, although the range of errors made proves to be very similar. Generally, patients with right hemisphere lesions do better at naming objects (common names) rather than people (proper names). When it comes to impairment in object naming, perceptual (visual) and semantic errors are numerous. They are also more numerous when compared with the scores of patients with left hemisphere damage. Errors in naming people in the form of unrelated words can suggest that the roots of the right hemisphere anomia also lie in semantic disorders of name retrieval, rather than perceptual deficits. A slight advantage of denotational paraphrases (circumlocutions) at the expense of connotational ones can suggest that patients with lesions within the right hemisphere have more problems retrieving associative knowledge about a particular denotation.

Chapter five (*Neurobiological basis of naming*) presents progressive naming deficits in a patient with a nonfluent variant of Primary Progressive Aphasia, which was monitored between 2013-2016. It is preceded by an overview of the most recent typologies of such disorders and the peculiarities of anomia as part of every subcategory of PPA. A longitudinal study was chosen specifically in order to avoid controversy related to including patients with deficits at different levels of language disintegration (involution) in the experimental group. The pattern of deterioration in naming deficits differs when compared with post-stroke aphasia, since PPA is characterised by scattered locations of damage.

What remains unchanged is the disproportion between the severity of proper as opposed to common name anomia in PPA and post-stroke aphasia. This means that the impairment of people naming (irrespective of the deficit type) is usually more severe, because it is harder to retrieve proper names than common nouns. The characteristics of the patient's naming impairment coincide with features well known from descriptions of post-stroke aphasia, such as selective anomia (the categories of colours and body parts) and selective retention of proper names within a particular modality.

Translated by Rob Pagett