Phonetic and/or phonological disorders in aphasic speech: An acoustic study of speech output in 4 Broca’s and 4 conduction aphasics

Anna Marczyk & Lorraine Baqué
Universitat Autònoma de Barcelona, Laboratori fLexSem, Departament de Filologia Francesa i Romànica
Anna.Marczyk@uab.cat

According to speech production models such as Levelt’s (1989), speech errors in aphasia can arise at different levels of processing: lexical, phonological or phonetic. It has been claimed that each type of aphasia is associated with a specific speech production disorder. Conduction aphasia is characterized predominantly by a breakdown of the phonological code, whereas Broca’s aphasia is a disorder affecting mostly the phonetic level. However, Blumstein (1973) argued against a typology of errors as a basis for the discrimination of different clinical pictures of aphasia and postulated that the type of errors should remain similar across all the aphasic groups. Such inconsistencies in the findings and in their interpretations are the result of different methodologies and research tools.

In our paper we wish to adopt an integrated approach to the sound structure study, analysing the phonetic information in relation to language-specific constraints. We seek to determine the phonetic and/or phonological nature of the errors produced by 8 aphasic patients: 4 Broca’s and 4 conduction aphasics, on the basis of acoustic, phonological and statistical analyses. The corpus included Spanish fricatives and plosives, in different phonetic contexts (345 items in total). The data were elicited from the subjects in the tasks of reading and repetition. Movement, exchange and blend errors were analysed phonologically and were excluded from acoustic analyses. Distortions and substitution errors were analysed acoustically for the parameters of VOT, VTT, absolute duration, number of noise-bursts and their duration. Substitution errors (ex.: [p] instead of [b] in vaso) were compared in terms of acoustic proprieties to correct productions of substituted sounds (ex.: [b] in vaso) and on target productions ([p] in paso) by the aphasic patient. When the erroneous productions exhibited acoustic characteristics appropriate to the substituted sound, we concluded that the nature of the deficit is rather phonological than phonetic. Finally, pathological productions were compared with a control group.

Our findings confirmed the hypothesis of the discriminating nature of error types in aphasia but also showed that the frontier between phonetics and phonology, in most cases, is not clear-cut. Our results provided also empirical support for a methodological approach in which phonetics is not separated from phonology.

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