Disorders of speech production in adult aphasia

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The study focused on "phoneme errors" in the speech of 15 aphasic patients. The errors elicited in different tasks were classified linguistically. Selected subsamples of speech were analyzed phonetically. Features differentiating between dysarthria, apraxia of speech and aphasia were discussed. There were relatively clear groups of dysarthric and (fluent) aphasic subjects whereas the third group was more heterogeneous. All the subjects had errors that involved segments of phoneme size. The errors were rated less fluent than the correct answers, and usually there was evidence that the patient knew the correct target.

INTRODUCTION
The present study attempts at a phonological and phonetic analysis of "phoneme errors" made by aphasic patients. These errors are of special interest because double articulation is often considered one of the defining characteristics of natural language. However, in the current literature on normal speech production there are different views about the role of the "phoneme".

In neurolinguistics some evidence has been presented for a hypothesis according to which a phonetic disorder involves articulatory gestures whereas "phoneme" substitutions are characteristic to a linguistic disorder (Blumstein & Baum 1987). The classification of speech production disorders in aphasia is problematic. Darley, Aronson, & Brown (1975) distinguish three types of disorders: dysarthria, apraxia of speech and aphasia. Especially apraxia of speech will be discussed as it is unclear whether it is primarily a linguistic or a motor deficit.

MATERIAL AND PROCEDURES
Speech perception tasks (syllable discrimination and word picture matching), articulation tests (diadochokinetic tasks), repetition (255 real words and 48 non-words), confrontation naming, and picture description tasks were administered to a "random" sample of 15 aphasic patients and 5 age matched controls.

The spoken answers were tape-recorded and the other answers were coded on answer sheets. The tapes were transcribed and the data was analyzed linguistically. Selected samples of speech were subjected to a listening experiment and acoustical analysis.

The patients were not prediagnosed. It was assumed that different behavioural patterns will "emerge" from the data as a result of the analysis. These groups can be compared with those obtained on the basis of the diadochokinetic tasks (cf. Darley & al. 1975, pp. 91-97).

MAIN RESULTS AND DISCUSSION
Two groups of patients, the dysarthric patients and (fluent) aphasics could be recognized easily. Typically, a dysarthric patient had a voice disorder, segments were lengthened, vowels were centralized, there was particular difficulty with word initial consonants (distortion, deletion, substitution, anticipation of a consonant that followed the
vowel), the patient did not try to correct the errors. The fluent aphasics made no errors in the articulation tests and few in the repetition task. They had a number of semantic paraphasias, verbal paraphasias and neologisms in naming and picture description. These error types were not typical to other patients. The third group of patients typically had difficulties in sequential motion rate, and their articulatory difficulties became evident with longer words of relatively complex phonetic composition. This group is heterogeneous, but some patients might be diagnosed as having apraxia of speech.

All the patients made at least a few errors of "phoneme" size. Contextual errors were more common than phoneme substitutions. In the listening experiment, incorrect answers were rated less well articulated than the correct answers. For both the controls and the patients, the repeated words were rated more fluent than the named words or repeated non-words. These findings could be accounted for by assuming that articulation is not completely fluent when there is a linguistic disorder.

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References