PHONOLOGICAL ANALYSIS OF APHASIC SPEECH

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The phonological research in aphasia has been undertaken using different theories of phonology and probably that is the reason why a clear distinction between phonetic and phonological disturbance has not always been made. Sound disturbance in aphasia can be traced to one or more of three different disorders.

(1) a disturbance of the abstract system of phonemes
(2) a disturbance of the neuro muscular encoding of the phonological unit (the syndrome of phonetic disintegration), and
(3) an associated apraxia of motor speech mechanism.

It is rather difficult to distinguish them while analysing the data due to the overlap of these disorders. In this aspect certain studies have been undertaken and some laws formulated. (Jakobson's law).

The present study was an attempt to describe the 'Phonological disturbances and the process of phoneme recovery in the speech of aphasies'.

The main questions were:

(1) What change does the phonemic system undergo in aphasies?
(2) Are the changes systematic?
(3) Is the phonemic recovery systematic?
(4) Is the recovery process sequential?

It was hypothesized that:

(1) Phonemic loss in aphasic speech is systematic.
(2) The process of phonemic reovery is systematic and sequential.

Method

The aphasic population represented in this study was selected from the indoor patients of the Safdarjang Hospital, New Delhi.

The selected subjects had to satisfy the following criteria:

(1) Subjects must be adult aphasies.
(2) The aphasia in these patients must have resulted from lesions of vascular origin according to the medical assessment.

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(3) They must not have experienced aphasia previously.

(4) They must be 'fresh' aphasics.

The reason being to analyse the speech from the 'no speech' to 'little speech' to 'more speech' period. Observations were made on the immediate post-morbid speech. Many authors—(Wep 66, Jones, Servo, Levita '71) agree that a majority of the dramatic changes in aphasia are confined to the immediate post traumatic period. Culton (1968) states that rapid spontaneous recovery of language function is noted in the first month following the onset of aphasia and that the later improvement is not very significant. It was initially planned to study the speech samples of each subject taken every day for the first one month after the onset of stroke but it was not possible to get the subjects for such a long period due to shortage of beds in the Government Hospitals. Therefore the speech samples of the subjects were studied for the entire period of their stay at the hospital, which was about 10 days.

(5) Subjects should have been either using Hindi as their 'first language' or the pre-morbid language must indicate considerable proficiency in Hindi.

(6) Finally all the selected subjects must obtain 'Aphasic Score' on the 'Porch Index of Communicative ability'.

Five subjects were selected for this study and—

(a) Information was obtained regarding their education, job, special interests etc., to obtain some idea of the subjects' pre-morbid speech and language proficiency. Speech samples of one of the close relations of the subjects was recorded as a clue to pre-morbid speech.

(b) Samples of the conversational speech of all the subjects was tape recorded every day for 15 minutes.

(c) Along with the recording of 'conversational speech', a 'say after me' test was given every day and the responses were tape recorded. This attempt was made to ensure the occurrence of all the phonemes in all phonetic positions, which may have been omitted by the subject during spontaneous speech.

Recording situation and equipment

Each subject was individually seen in the ward. A comparatively quiet corner in the ward was selected during the recording sessions. The speech samples were recorded on a 'Midland' tape recorder at the speed of seven and one half inches per second.

The raw data for this study was obtained by recording the conversational speech of all the subjects. The session consisted of an open ended conversation regarding subjects' personal history, family history, work hobbies, etc. Questions asked were used only as a means of eliciting as much speech as possible.

Analysis of Data

Each tape recorded interview was listened to completely and those phonolo gical errors made by the patients were transcribed. The attempted target word was also noted. Only those errors whose target words could clearly be determined by the surrounding context were used in this analysis.

The transcription was done with the help of 2 post graduate students of Speech Pathology and Audiology having sufficient knowledge of Hindi language.

The transcribed data was analysed in the following manner:

(a) Phoneme frequency distribution: Randomly selected speech samples of two subjects consisting of 1000 consonant phonemes were analysed for the frequency of occurrence and compared with the normal phoneme frequency distribution in Hindi. The rank order correlation coefficient was .91 highly significant at the .01 and .05 levels of confidence.

(b) Distribution of Errors: With the phonemic frequency distribution for the aphasic speech sample it was possible to consider the relationship between the phoneme error rate and frequency of occurrence. A. rank order correlation coefficient between the errors made on each phoneme and its actual frequency of occurrence in aphasic speech showed 'no' significant relationship.

(c) Total Phonemic Error: Total number of uttered phonemes and target phonemes were counted and an overall error percentage was calculated for each sample, to get an idea of subject's linguistic recovery at the phonological level. There was a gradual reduction in the total error from the first to the last day in all the subjects. All the subjects showed a gradual improvement in terms of increase in the number of intelligible words.

(d) Distribution of Error Types: All the phonemes were compared with the target phonemes and the deviations were categorized into:

(i) Severe distortions
(ii) Substitutions
(iii) Mild distortions
(iv) Omissions
(v) Additions.

The distribution of errors made within each group was examined. The mean percentage of each error type was determined for each sample.

(i) There was a gradual reduction in all the types of error except substitution from the first to last day.
(ii) There was a gradual increase in substitutions from the first to last day.

(e) Analysis of Substituted Phonemes: Phoneme substitution errors were analyzed in terms of distinctive features. They were classified into errors of one or more than one distinctive feature. Then each phoneme substitution error characterised by a single feature change was classified according to the direction of the error made—whether the change was from the marked consonant to unmarked or vice versa.

(t) The distinction between /l/00,/r/, and /w/ was observed to have been lost in all the subjects and not much improvement was seen in this type of error till the last day. This distinction is also acquired late in the child's acquisition of language. Often /t/, /d/, /n/ were substituted for these liquids.

(it) They made confusions between voice/voiceless consonants, e.g., */t/, /d/; /k/, /g/*etc. There was a marked reduction of this error in the last speech sample. This observation does not support the concept of 'Phonemic regression' as the children acquire this distinction very early in their language acquisition period.

(iii) The loss of distinction between the nasal and their oral homorganics was noticed in all the subjects. There was an equal tendency for the nasal consonants to be substituted by the oral consonants and vice versa. This confusion shows the selection of the wrong phonemes.

(iv) The subjects showed a lot of confusion between affricate-continuent fricative, affricate-stop, continuent-stop and continuent-affricate.

(v) The distinction between aspirate/non-aspirate phonemes was observed to have been lost in all the subjects. The aspirate was added to the phoneme inventory not before the 4th speech sample.

(vi) Subjects also made a great number of errors in the place of articulation, *jt/* and /d/ were most frequently substituted for other sounds. A consonant changed its place of articulation to the one nearest the target sound.

(mi) The distinctive feature analysis for the last day of observation demonstrates that in all the subjects, significantly more errors were made of one distinctive feature than errors of more than one distinctive feature.

(rait) Subjects were unaware of the errors made by them.

Conclusion

The most consistent finding in the phonological analysis condu cted was the relative uniformity of error types and error direction in each subject. Included in the speech pattern of these subjects were errors of type i.e., distinctive value of phonological system—-phoneme substitution, omission, addition as well as patterns of phonetic distortion super-imposed on the subject's entire speech production. The subjects were not aware of the errors made of substitution. It seemed that a wrong phoneme was selected. However, this confusion seemed to be within certain limits.

These results support the hypothesis:

(a) **Phonemic loss in aphasia is systematic.**

(b) **Phonemic recovery in aphasia is systematic though this is not the same as the child's acquisition of phonology.**