SPEECH CHARACTERISTICS OF A PATIENT WITH APRAXIA OF SPEECH

- A Preliminary Case Report -

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Apraxia of speech, an articulatory disorder distinct from dysarthria, can occur in combination with various degrees of symbolic disturbances due to aphasia, or less frequently, in relatively isolated or "pure" forms (Darley, 1968; Johns and Darley, 1970; and Shankweiler and Harris, 1966). The case to be reported here may well belong to the latter category on the basis of the routine diagnostic speech and language examinations. A phonological analysis of his speech, however, has revealed a few points which may throw some light on some additional aspects of the problem.

Mr. K., a 56-year-old executive of a large company, was in his usual state of health until two o'clock in the afternoon of March 14, 1970 when he suddenly felt numb in the right arm while golfing, and felt dizzy for a while (approximately thirty seconds in retrospect). After taking a rest for a few minutes he felt all right again, went back to his car, and started to drive home. As soon as he began to drive, however, he felt dizzy again and collided his car into another car driving just ahead of him. Fortunately, the crash did not cause any serious damage to either party, and he drove to the nearby police station immediately, in order to report the accident. When he tried to explain the circumstances to the policemen, he found himself unable to utter a word, and was admitted to a nearby hospital. His phonation came back a week after the day of the accident, but it took more than a month before he was able to produce anything like speech sounds.

According to the medical records, his examination upon admission revealed no gross abnormalities. He had a blood pressure of 140/90 and a regular pulsation of 66/min. Upon neurological examination, no cranial nerve involvements were found. Motor and sensory examinations gave normal records except a positive Rossolimo on the right side of the lower extremity. The EEG or CAG did not uncover any abnormalities, either.

In summary, the findings were inconclusive with regard to the etiology, but it was suspected that he had incurred a transient attack of cerebral infarction due to thrombosis just before the accident.

Speech and Language Examination: An extensive speech and language examination was conducted seven months after the onset of the illness when he was first referred to the author. On a comprehensive aphasia test battery, he responded at a near-normal level in all modalities except on oral production where he exhibited conspicuous impairment in articulation as well as in prosody due to apraxia of speech, without any sign of disturbances in muscular control of speech mechanisms. There was no sign of oral apraxia, either.

As for auditory comprehension, he could follow quite complex oral instructions with accuracy and promptness; performed at a normal level on the Token Test (De Renzi and Vignolo, 1961); and made no errors on a test of auditory perception of words and phrases which were minimally varied phonemically (similar to one described by Aten, Johns, and Darley, 1971, but specifically tailored by the author for this particular patient in the hope of uncovering possible areas of auditory impairment).

In reading and writing, his test scores were well within the normal range, too, except that there was a slight reduction in speed of performance. According to his introspective report, the reduction in speed of reading and writing can be ascribed to the difficulty of handling the kana-transcribed words rather than the kanji-transcribed words in the sentences. In addition, on the test of spontaneous writing of five simple sentences with six to eight words per sentence, he made one substitution error of a kana transcription representing a particle in a sentence, this type of error being rarely observed among the normal population. In summary, these findings may safely be interpreted to indicate that this is an example of a relatively "pure" form of apraxia of speech, with preservation of close to normal linguistic performances in all areas except in reading and writing, even where the degree of the impairment is not marked.

Phonological Analysis: Various speech samples (including repetitions of syllables, words and phrases of various lengths and articulatory complexities, oral readings of sentences and paragraphs, as well as spontaneous speech in a variety of situations) were tape-recorded for later analyses.

The following are some of the findings obtained from a preliminary analysis of one type of his speech samples, i. e., an oral reading of a 298-word text in Japanese orthography.

1. In general, his reading performance was characterized by marked articulatory errors and prosodic disturbances.

2. Of the total of 68 instances of phonemic errors, the most predominant type was a substitution of a syllable or a phoneme (88. 2%). Syllabic additions (5. 9%), syllabic omissions (4. 4%), and a syllabic repetition (1. 5%) accounted for the rest of the errors.*

3. Of these substitutions, metatheses were the greatest in number (38. 3% of the total substitutions), followed by anticipatory (regressive) assimilations (35. 0%), random substitutions (20. 0%), and perseverative (progressive) assimilations (6. 7%).

4. The metatheses (either adjacent or nonadjacent) took place not only with respect to syllables, phonemes, or distinctive features within the boundary of a word, but also to those across the word boundaries. There were also observed a few occasions of metatheses of words and short phrases.

5. A similar characteristic was observed in the anticipatory assimilations: two-thirds of them took place within a word and the rest across the word boundaries, often across several word boundaries.

6. In nearly one half of the random substitutions, only one distinctive feature** was substituted per occurrence, and in the remaining half two distinctive features at the same time. Types of features substituted were: those pertaining to the place of articulation, tense-lax, nasalization, and palatalization, occurring approximately evenly.

7. There were not any specific syllables, phonemes, or distincitve features which were obviously more frequently confused than others. This is not in agreement with the findings of Shankweiler and Harris (1966) or of

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* On the level of phonetic analysis, a great many instances of "distortions" were observed. These phonetic errors or inaccuracies, however, will not be discussed in this report.

** We use the term "distinctive feature" in a loose sense for the present purpose.

Johns and Darley (1970) in which consonants were more frequently misarticulated than vowels; and fricatives, affricates, and some consonant clusters were more frequently misarticulated than others.

8. When the incidences of errors of initial versus non-initial sounds of words were compared, the former accounted for only 26.5% of the total errors. This was not in agreement with the general notion that errors tend to occur at initial rather than non-initial sounds of words.

9. When the incidences of errors on long-word (three or more syllables) versus short-word (one or two syllables) were compared, the former was almost six times the latter (58 versus 10 incidences). Since the proportion of the long versus short-words in the text was 72:226, this means that 80.6% (58/72) of the long words, compared to only 4.4% (10/226) of the short words, were affected by articulatory errors. This is in agreement with the findings of Johns and Darley (1970) and Darley (1968) that errors increase as words increase in length.***

10.. The major prosodic disturbances observed were: an overall reduction of the speaking rate, irregularly spaced pauses, stuttering-like hesitations and blocks, abnormal pitch contours (tending toward monotonous pitch and stress control). There was apparently no loss, however, of distinctions in word accent patterns.

Final Remarks

The results of this preliminary analysis indicate that some of the findings are in agreement with those already reported by other authors (Shankweiler and Harris, 1966; Darley, 1968; Johns and Darley, 1970), while others are not. An explanation for the discrepancies may be sought in the specific type of apraxia of speech this patient presented; or in the specific stage of the recovery process he was in at the time of the testing. The facts observed here, particularly of "long-distance" metatheses and other configurational errors pertaining to sequential arrangements of phonological units as described above, may strongly indicate that the impairment was not

*** In fact Mr. K. did not show any difficulty in repeating individual syllables whether with meaning or without. His main difficulty apparently resided in sequential arrangements of phonological units.

confined to the motor aspects of speech ("pure" apraxia of speech) but extended into the linguistic (but almost exclusively phonological) spheres as well. A slight reduction in his reading and writing functions, specifically in handling phonologically-transcribed (kana) words, seems to endorse this interpretation.

References

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