

PRELIMINARY OBSERVATIONS ON THE BEHAVIOR OF SOME APHASICS
IN A SENTENCE CONSTRUCTION TASK

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In this paper, we report observations on the behavior of some aphasic patients performing a sentence construction task. To begin, we will describe the task given as a test. In the first part of the test, the words composing a given unambiguous sentence are presented in a systematic but meaningless order on separate cards, each containing a single word. The patient must rearrange the cards in the proper order to form the sentences. In general terms, the test concerns the extent to which the aphasic patient can operate with a complex system of grammatical expressions. Since the test requires conscious operations with phrases and special analysis and synthesis of the component parts of the sentence, the patient can perform it only if he appreciates the grammatical structure of the sentence. If the sentence is simple and presents a familiar situation, the patient completes the process of construction promptly and grasps the meaning at once. However, if the sentence is complicated and requires the formulation of a new system of connections before the patient can understand it, the process requires a prolonged examination and stage-by-stage analysis of the subject matter. Consequently, the test successfully analyzes latent grammatical disturbances.

In the second part of the test, the examiner asks questions concerning the content of the completed sentence. Two types of questions are asked. The first type requires a "yes" or "no" answer related to the meaning of the sentence. The second requires isolation of the appropriate basic semantic elements of the sentence. Let us illustrate the task with the following example:

1. What correlation exists between successful construction of a sentence and the ability to answer questions about information contained in the sentence?
2. Under what conditions can a patient who is unable to arrange the words into a sentence still answer questions about its meaning?
3. Can a patient speak the sentence correctly and still be unable to sequence the word-cards?

4. To what extent is judgement of grammatical and semantic correctness of sentences preserved in the aphasic patient?

The nature of the sentence construction test imposes several restrictions on the aphasic population who can be given the test. The basic restrictions are:

1. The ability to read words.
2. Sufficient residual language to understand the words used in the test and the basic syntactic structures represented in the sentences.
3. Sufficient education to comprehend the task.

If the patient cannot arrange the sentence, the examiner offers help of a defined type, namely, giving the first word of the sentence, and, in the case of persisting severe difficulty, the first two or three words. The examiner records the amount of help given, and this is reflected in the final score of the patient's performance. By giving help, we investigate the utilization of certain linguistic cues in sentence construction. We believe that this information may provide clues to therapy.

At this early stage of our research using the sentence construction task, we report the following observations:

1. Most aphasic patients displayed awareness of the semantic and grammatical correctness of the sentences they constructed. They expressed dissatisfaction with incorrect sequences of words which they had constructed and immediately accepted the correct form. Very few of them will accept sentences which are clearly ungrammatical, e.g., "they live house in the." However, a few patients accepted some semi-grammatical sentences which preserve the meaning of the sentence, or contextually inappropriate sentences, e.g., "we could not to him speak," instead of "we could not speak to him;" or "parents expect to obey their children," instead of "parents expect their children to obey." On the whole, aphasic patients seem unaware of alternative versions of a sentence in cases permitting permutation of elements in a given sentence. Thus, they may overlook the possibility of interrogatory transformations, e.g., "Are John or Ed doctors?" as opposed to "John or Ed are doctors" or adverb placement, e.g., "She played music every Sunday" as opposed to "Every Sunday she played music."
2. Our second observation concerns the strategies and cues which aphasic patients use in the process of sentence construction. We have observed certain

grammatical strategies such as placing personal pronouns and interrogative adverbs at the beginning of a sentence and placing articles or prepositions before nouns, which we interpret as phrase building. However, semantic or contextual clues seem more effective than purely grammatical ones. This is consistent with the performance of a normal sample on the same task. These linguistic strategies, even if present, collapse rapidly if the sentence is too long or too difficult.

Of all the various strategies, auditory feedback appears to be the most powerful. The operation of this strategy is manifested in the following ways. Each time a given sequence of words of a sentence is produced by the aphasic patient, he often reads it aloud to himself and either accepts it or, if the sentence does not sound correct, rejects it. After rejection, he usually begins another word sequence, repeating the process until he finds the desired auditory representation, which usually is the grammatically correct response.

Aphasic patients who have difficulty reading the sentence aloud themselves ask the therapist to read the sequences to them and pursue the same process of selecting the final response. Utilization of auditory feedback seemingly provides the patient with the strongest compensatory mechanisms for loss of grammatical strategies. We emphasize, however, that the aphasic patients who display such behavior are free of serious auditory deficit. Moreover, we observed that auditory feedback provided by the therapist is usually more effective than feedback generated by the patient. This phenomenon may result from interference due to the internal processing of the information by the patient as opposed to the information which comes from the outside and thus provides a distinct stimulus.

Certain observations concerning the function of cues in the sentence construction task seem paradoxical. Providing pictures depicting the content of the sentence to be constructed, e.g., a picture of a girl drinking milk, does not seem to facilitate sentence construction. Conversely, various arrangements of words in terms of more or less scrambled sequences given to the patient as a starting sequence does not seem to impair performance. These observations could be generalized as poor integration of cues coming from different sources in the sentence construction task.

Finally, we report what seems to us the most striking phenomenon in the sentence construction task, namely, a deficit in sequencing. This deficit appears in the inability to sequence the printed word-cards in the sentence, even when the patient has given the correct verbal presentation of the sentence. We can describe the phenomenon in the following way. The patient says the sentence in the correct sequence but cannot reproduce the sequence in the physical arrangement of word-cards. Further, he reads the incorrect card sequence

consistent with the auditory representation without recognizing the discrepancy. Even if the therapist asks the patient to read while pointing to the individual words, the patient still produces a correct auditory sequence of the sentence. When the aphasic patient recognizes the sequencing errors, he becomes confused and starts randomly shifting the position of word-cards. This deficit has been the most consistently identifiable behavior, although it occurs with various degrees of intensity. We feel this deficit is important to the investigation of the mechanisms underlying aphasia, since temporal sequencing is one of the integral components of language structure. We plan further tests using other linguistic tasks such as sequencing of letters in words, semi-linguistic tasks such as sequencing of digits, and nonlinguistic tasks such as sequencing of pictures, to determine whether the deficit is restricted to linguistic performance or is of a general cognitive nature.

Our observations on the function of auditory feedback and the sequencing deficit in the sentence construction task may reflect the nature of spoken as opposed to the written medium of speech. Speech may be the primary representation of language and written language a secondary one. We also speculate that this dichotomy indicates the aphasic patient uses his linguistic knowledge better in comprehension than in expression.

Next, we report on the use of the test in therapy. We have observed the following improvements in the linguistic performance of aphasic patients regularly exposed to sentence construction tasks in therapy:

1. Improvement in writing.
2. Improvement in the phonological form of the sentence constructed, namely, in articulation, intonation, and stresses.
3. With an apraxic patient, an increase in the number of correctly produced words in a constructed sentence.
4. Improvement in repetition of the sentence.
5. Better awareness of the grammatical function of sentence elements, and, consequently, improvement of general comprehension. This observation has been based on responses of aphasic patients to questions given after completion of the sentence. The questions are of the type "who," "what," and "yes" and "no."

We have found the task useful in teaching formation of questions from statements requiring permutation and or addition of elements, which could have been physically manipulated. We have also found the task useful in sentence drills where members of classes can be changed in a particular sentence pattern.

Patients seem capable of a certain amount of generalization of the linguistic structures present in sentences. Much more experience with the sentence construction task in a therapy situation is needed to define its value.

Finally, we are also interested in the diagnostic value of the sentence construction task in aphasia as well as the prognostic value it could have for predicting recovery. The latter aspect is based on a general premise that there is a reasonably good correlation between an aphasic patient's performance on an experimental task and his ability to benefit from language therapy. All observations reported in this paper are based on a pilot study. A comprehensive investigation of all the problems discussed is being carried out at the present time.