SYNTACTIC IMPAIRMENTS IN APHASIA*

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Syntactic impairments have recently been regarded as a type of language disturbance independent of other disorders. Schuell et al., on the contrary, seem to suggest that syntactic impairments are dependent on other types of disorders such as "reduction of available vocabulary, impaired verbal retention span," etc.** The present series of experiments were carried out to examine whether Schuell's position could in fact be justified.

PROCEDURE

Subjects:

Ten aphasic and nine nonaphasic patients with unilateral hemispheric lesions were investigated and compared. The age range for the aphasics was from 21 to 65 years with a mean of 43.7 years, and for the nonaphasics from 44 to 69 years with a mean of 56.4 years. The mean educational experience of the aphasic group was 10.8 years, and that of the nonaphasic group was 10.3 years. The subjects were selected on the basis of the requirements that (1) they be classified as Group 1*** by the Schuell-Sasanuma

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** H. Schuell, J. J. Jenkins, and E. Jiménez-Pabón (1964), Aphasia in Adults: Diagnosis, Prognosis and Treatment, New York: Harper and Row.

*** Simple aphasia, defined as the reduction of available language in all modalities, in the absence of specific perceptual, sensorimotor or dysarthric components. (Schuell et al., ibid. p. 190)

Test for Differential Diagnosis of Aphasia (3rd research edition)* , and that (2) their performance on the three SSTDDA subtests on kanji- and kana-word reading show sufficient ability to handle the material used in the present experiments.

Tests and Test Materials:

Three tests (Test 1, 2 and 3) originally designed for the evaluation of linguistic performance, and two SSTDDA subtests were used.

Test 1 (Visual Naming Test):

One hundred picture cards (colored drawings) of 50 high-frequency and 50 low-frequency words** were used as visual stimuli. High-frequency words were in the range of 100 to thousands of occurrences per million, and low-frequency words were in the range of less than 50 occurrences per million. The patient was asked to name each picture presented to him. A score of 1 was given for every item named correctly within 5 seconds from the time of presentation of the stimulus, and one-half credit (.5) for the correct response with a delay of between 6 to 15 seconds.

Test 2 (Syntactic Test):

In this test, two sets of cards of printed words were used. Set 1 consisted of cards displaying each of the six grammatical particles, ga, o, ni, te, kara, and made in Japanese. All of the cards were kept on display in front of the patient throughout the test period. Set 2 consisted of 24 cards employing 58 lexical words as the material in 16 word sequences of positional relations such as hako-no-mae (in front of the box), six adverbial phrases such as sawatte-kara (after touching), and six verb phrases which can modify head nouns such as oite-aru (put, past participle). The patient was given two or more items of Set 2 and was asked to make a sentence by arranging

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* Schuell-Sasanuma Test for Differential Diagnosis of Aphasia (SSTDDA) is the Japanese version of the 7th research edition of Schuell's Test for Differential Diagnosis of Aphasia.

** These words were drawn from the "Vocabulary Frequency Table, " in Volume 1: General Description and Vocabulary Frequency Tables, in Gendaizassi 90-shu no Yōgo Yōji [Vocabulary and Chinese Characters in Ninety Magazines of Today] Report of the National Language Research Institute, No. 21 (1962).

them and adding one or more of the particles in Set 1. The total number of sentences to be composed were 24, and the number of the particles to be used in these sentences were from 1 to 3, with an average of 2.08. The sentences were varied along two parameters: length and syntactic complexity. The length, in terms of the number of printed cards, ranged from 2 to 5. The syntactic complexity was controlled by introducing subordinate or co-ordinate structures.

It was ascertained beforehand that the subject understood the meaning of all the words used, by having him match the actual objects with the printed cards for the words, in the case of nouns, and by having him perform the action, in the case of verbs.

Scoring: A particle correctly used in the sentence constructed in less than two minutes (for 2 or 3 cards) or three minutes (for 4 or 5 cards) upon presentation of the stimuli, was given a score of 1. If the patient could not form a correct sentence within the given time, a correct word order was shown to him by the examiner. He was then instructed to make the correct choice of one or more particles and a score of 0.5 was given to each particle correctly used.

Test 3 (Syntactically Conditioned Noun Retrieval):

The patient was given a card that displayed part of a verbal expression which consisted of a verb and a particle of the case for object or place/direction (viz. "o" or "ni", respectively). He was then asked to give as many nouns as he could within 30 seconds that fitted into the given frame*. The number of verbs used in this test was 20; 10 high-frequency and 10 low-frequency verbs. (See footnote **, p. 92) It was ascertained beforehand that the subject understood the meaning of all the verbs used, by having him match the printed cards for verbs with the pictures representing behavior. A score of 1 was given for every correct response.

SSTDDA Subtests:

There were two SSTDDA subtests on the auditory retention span. In one of them, the patient was asked to point to two or more pictures according to the auditory stimuli given to him. In the other test, the patient

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* Japanese does not require an overt grammatical subject.

was asked to point to multi-digit numerals in the same order or in the reverse order of the given auditory stimuli. The total number of such combinatory test items was 30. Every correct response was given a score of 1. If the subject pointed to the correct pictures or to the correct numbers in the wrong order, a score of 0.5 was given.

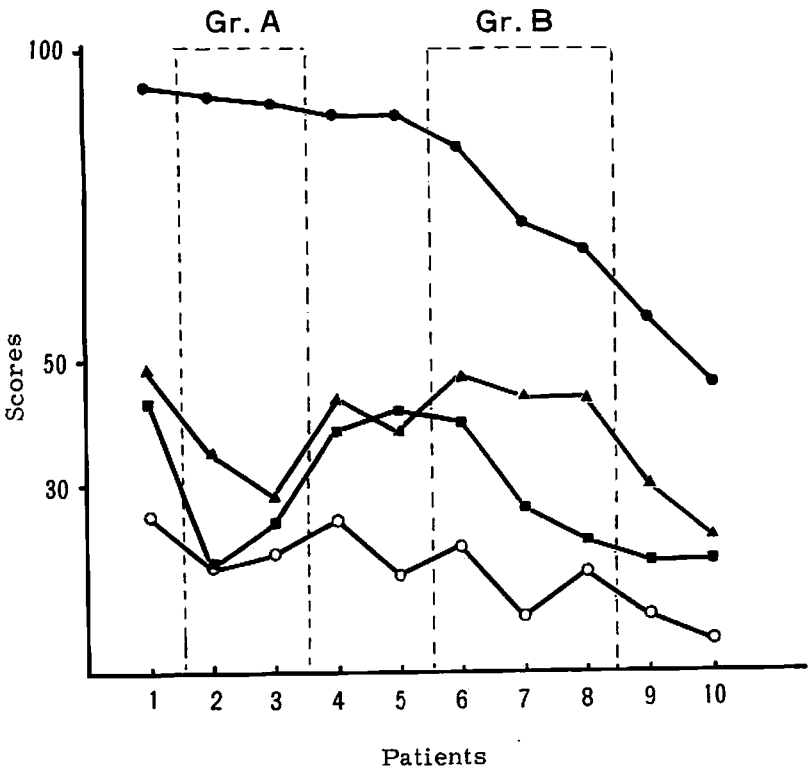
RESULTS

The scores obtained for the aphasic patients on the three experimental tests and the two SSTDDA subtests are shown in Figure 1. On the basis of these data, we may summarize the findings as follows:

1. The scores obtained from Test 1 dispersed over a wide range of 46.0 to 94.0, with a mean of 78.5 versus 98.3 for the control group. On the basis of these scores, the aphasic patients were numbered from 1 to 10 from high to low.

2. A low correlation was obtained between the scores of Test 1 and Test 2 (Spearman's rank correlation coefficient: $r_{sb} = .350$). Patients No. 2 and No. 3 (henceforth called Group A), who obtained the second and the third highest scores in Test 1, were ranked relatively low in Test 2 (seventh and ninth, respectively). The performances of patients No. 6, No. 7 and No. 8 (henceforth Group B) in contrast were ranked relatively low in Test 1, while in Test 2 they achieved relatively high scores.

3. The range of scores for Test 3 for aphasic patients was from 17 to 43, with a mean of 28.8 (versus 67.8 of the control group). A high overall correlation was obtained between this Test 3 and Test 1 ($r_{sb} = .618$) and also between this Test 3 and Test 2 ($r_{sb} = .650$), as expected. In the case of the Group A patients, however, their rank order of performance in Test 3 does not correspond to that in Test 1; they showed a much lower level of performance in Test 3 than in Test 1. In the case of patients No. 7 and No. 8 of Group B, their rank order in Test 3 did not compare with that in Test 2, the performance in Test 3 being at a much lower level than in Test 2.



Test 1 (A perfect score is 100)

Test 2 (A perfect score is 50)

Test 3 (The total number of correct responces)

SSTDDA subtests

Figure 1

DISCUSSION

The results obtained from this study (in particular, those pertaining to Group A patients, No. 2 and No. 3, and Group B patients, No. 6, No. 7 and No. 8) seem to suggest the existence of more than one linguistic aspect that underlies the language disturbances in aphasia.

The fact that Group A, in comparison to Group B, showed relatively lower scores in Test 2 (syntactic test) despite their higher ranks in both Test 1 (naming test) and the verbal retention span tests, may safely be interpreted as an indication that the Group A patients had a greater degree of difficulty in syntactic processing than in naming when compared to Group B patients. On the verbal retention span test, Group A patients had higher scores than Group B, and in Test 2 (syntactic test) Group A patients made mistakes even on the easiest (two-card) items, while Group B patients did not make any mistakes on these items.

Similarly Group A, in spite of the good scores in the naming test, received low scores in Test 3, probably because they suffered from impairment of the syntactic functions which conditioned the retrieval of pertinent nouns. On the other hand, the scores of Group B patients on Test 1 and Test 3 show widely varying scores in parallel, as seen in Figure 1, while their scores on Test 2 were almost constant and relatively high. This may suggest that for these patients, the impediment in performance with Test 3 was due to the common factor shared by this test and the naming task. The patients other than Group A or Group B performed almost at the same relative levels on all of the tests without showing any marked discrepancies between syntactic and naming abilities.

These findings demonstrate that our subjects, who are classified all into the same clinical subtype called Simple Aphasia in Schuell's classification, in fact showed substantially different patterns of impairment in their linguistic abilities. This may be of importance from the clinical as well as the theoretical point of view.