Studies in the development and breakdown of the use of names

III Recovery from nominal dysphasia

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The manner in which language functions recover after they have been impaired by cerebral lesions must have important implications both for management and theory, and yet very little attempt has been made to trace or define the pattern of recovery from dysphasia. Much work has been done to elucidate the likely outcome from different degrees and types of disorder (Schuell, 1960), the therapeutic approach most likely to be beneficial (Butfield, 1958), and the effect of extralinguistic factors on recovery (Zangwill, 1947; Wepman, 1953). A good deal is also known about the degree of recovery possible from lesions in different cerebral areas (Roberts, 1958). So far, however, the actual manner in which speech functions are recovered by subjects who have been rendered temporarily aphasic, and the similarities or differences between this process and that of acquisition in childhood, have received little attention. Perhaps one of the reasons such a study has not been undertaken is the absence of generally accepted scales or tests on which to assess language functions. Hence if a patient is seen on two different occasions by two different clinicians, his language performance may be assessed by two quite different methods, and will be evaluated according to different standards. Assessment of change or improvement is obviously of little value in such circumstances.

In 1962 we described a simple test of naming which was applied to 32 dysphasic adults and over 100 children between the ages of 5 and 11 years. The test demanded the naming of three common objects and four of their parts, namely, a watch, its hands, the buckle on the watch-strap, a comb, its teeth, a basket and its handle. These items were all drawn in simple outline on a white card, and the subject was asked to name each one as it was pointed to. If a subject was unable to name an item spontaneously, he was prompted by means of cues. For each object to be named, four cues were offered. Cue (a) consisted of a simple description of

the object's use; (b) provided a verbal context; (c) attempted to evoke the name by a rhyme or by its direct utterance, in another context; (d) spelt the name aloud (see Table III).

Among both the children and the dysphasic patients a close correlation was found between the difficulty presented by the object (as judged by the age at which it is learned by children and the number of errors made in naming it by dysphasics) and the number of cues required to elicit its name. The giving of a correct name in response to one or more cues appeared to be an intermediate phase between total failure and unassisted success.

Some of the dysphasic patients reported in the previous paper were followed up over succeeding months and were given the same test after a general improvement in their language functions. It is therefore possible to assess the pattern of recovery of naming function in this group in a way which has hitherto never been described, and compare it with the performance of children between the ages of 5 and 11 years.

In addition another 22 pictures representing common objects were given as a naming test without cues to seven dysphasic patients who were re-tested after a few days.

EXPERIMENT 1

This study was carried out on 17 adult subjects suffering from clinically recognizable disorders of speech associated with cerebral lesions and 46 children aged 5 to 11 years. The subjects may be divided into three groups according to the procedure employed:—

GROUP 1: CHILDREN Twenty-seven children aged from 5 to 7 and 19 children aged from 8 to 10 years who were regarded by their school teachers as of average intelligence and educational achievement were interviewed individually. Each child was asked to name each of the seven items in the test as E

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pointed to it, and, in the case of failure, he was prompted as described above. The objects were always presented in the same order, but the cues were given in a previously arranged random order, the original purpose of which was to discover the value of the cues irrespective of the effect of summation (Rochford and Williams, 1962). If a subject was unable to give the name even after all four cues had been presented, the correct name of the object was told him. He was then employed on other tests for a period of 10 minutes, after which he was asked to name those objects on which he had previously failed.

GROUP 2: ACUTE DYSPHASICS Ten adult dysphasic patients, whose clinical particulars have been described in a previous paper (Rochford and Williams, 1962) were given the naming test in the same way as the children, except that the objects to be named were presented in a different order in each case to overcome the effects of fatigue, blocking, and perseveration which might have influenced the results. At the end of the interview which lasted about 10 minutes, the test was repeated, the order in which the objects were presented again being altered, although for each object the cues were presented at the re-test in the same order in which they had been given first.

GROUP 3: RECOVERED DYSPHASICS Ten adult dysphasic patients (three from the above group and seven with similar clinical symptoms) who had been given the naming test in the acute phase of their illness were re-tested after a general improvement had been noted in their language function. The time between the first and second tests varied from three months to three days, and the degree of recovery varied from slight but clinically noticeable to almost complete.

RESULTS

The changes seen in the performances by the above groups have been plotted against the number of cues needed to name each item on first presentation, regardless of the item itself or the name involved

FIG. 1. Proportion of correct responses given by different groups.

(Tables I and II). Since the number of items falling into each category was small, however, it was decided to group the responses into 'easy' (needing one or two cues), 'hard' (needing three or four cues), and 'failed'. It will be seen that the easier the item (as measured by the number of cues required to elicit the correct response on first presentation) the greater the proportion of correct responses given at the re-test by all groups of subjects. This general tendency is shown both by children and by dysphasic adults, but the total gain is greater in the children than in the dysphasics and is greatest of all in the oldest children (Fig. 1) and smallest in the acute dysphasics.

TABLE II

NUMBER OF CUES REQUIRED TO NAME ITEMS IN TEST AND RE-TEST

Number of Cues Required at First Test	Number of Cues Required at Re-test	
	Acute Dysphasics	Recovered Dysphasics
1 or 2	1.35	0.6
3 or 4	1.7	0.6
Not given in response to cues	3.1	2.1

TABLE I

CHANGES IN PERFORMANCE RELATED TO NUMBER OF CUES NEEDED TO NAME ITEMS

Number of Cues Required at First Test	Children				Acute Dysphasics (N = 10)		Recovered Dysphasics (N = 10)	
	5-7 Years (N = 27)		8-10 Years (N = 19)		Number of Items	Proportion Right	Number of Items	Proportion Right
1 or 2	32	0.91	22	0.91	14	0.36	22	0.7
3 or 4	15	0.75	7	0.86	6	0.33	10	0.7
Not given in response to cues	15	0.46	6	0.83	14	0.14	9	0.3

Although the acute dysphasics (group 2) did show a general overall improvement on re-test, the most striking characteristic of their performance was the manner in which they tended not only to fail on the same items each time, but to respond to the same cues in the same way. The individual performances of two patients are shown in detail in Table III. S 1 was re-tested a total of four times at intervals of half an hour at the first interview. Her performance on the different trials remained remarkably stable even though the items were presented in a different order on each occasion.

The rank-order correlation coefficient $w = 0.86$. Using Fisher's z test this is significant for this number of cases at the 1% level.

S 2 also showed some consistency in his two trials on the same day, but after general improvement in his language function it will be seen that three of the four names which were regained with the aid of cues at the first interview can now be given without

any cues at all, while the name which was completely failed before can now be given after three cues.

EXPERIMENT 2

Seven adult dysphasic patients were asked to name simple pen and ink drawings of objects. Eighteen of these were chosen to represent different values of word frequency according to the Thorndike-Lorge word count (Thorndike and Lorge, 1944). 'AA' words occur at least 100 times per million, and 'A' between 50 and 100 times per million. The other numbers represent the number of occurrences of a word per million. The words used with their frequency values were:—Book (AA), heart (AA), castle (A), key (A), telephone (A), angel (47), candle (43), pencil (40), drum (40), kettle (27), anchor (26), piano (26), web (14), rake (13), skull (12), skeleton (11), dice (8), whale (8).

TABLE III
PERFORMANCES OF TWO PATIENTS ON SEVERAL TESTS

Test Item and Cues	Patient S 1				Patient S 2		
	Re-tested on Same Day at Half-hour Intervals				Re-tested Same Day		After General Improvement
	1st	2nd	3rd	4th	1st	2nd	
<i>Watch</i>	✓	✓	✓	✓	—	—	✓
(a) We tell the time by it					—	—	
(b) It is a wrist . . .					witch	witch — ✓	
(c) Not a scotch but a . . .					✓		
(d) It is a WATCH							
<i>Comb</i>							
(a) We do our hair with it	✓	✓	✓	✓	✓	✓	✓
(b) A brush and a . . .							
(c) Not a home but a . . .							
(d) It is a COMB							
<i>Basket</i>	✓	✓	✓	✓	✓	—	✓
(a) We carry things in it						✓	
(b) It is a shopping . . .							
(c) Not a casket but a . . .							
(d) It is a BASKET							
<i>Hands</i>							
(a) They point to the time	—	—	✓	—	—	—	—
(b) Our feet and our . . .	—	—	—	—	—	—	—
(c) These are my . . .	—	✓	—	—	✓	✓	✓
(d) They are HANDS	—			✓			
<i>Teeth</i>							
(a) They run through the hair—	—	—	—	—	—	—	✓
(b) We bite with our . . .	—	—	—	✓	—	—	
(c) These are my . . .	—	—	—	—	✓	✓	
(d) They are TEETH	—	—	—				
<i>Handle</i>							
(a) The thing you hold it by ✓		✓	✓	✓	—	—	—
(b) You hold on to the . . .					✓	—	—
(c) Not a mandle but a . . .						—	—
(d) It is a HANDLE						—	✓
<i>Buckle</i>							
(a) The thing that fastens	—	—	—	—	—	—	—
(b) The strap and the . . . ✓		—	—	—	—	—	—
(c) Not a chuckle but a . . .		—	—	—	—	—	✓
(d) It is a BUCKLE		✓	—	—	—	—	

TABLE IV

TOTAL ERRORS FOR IMPROVED AND WORSE GROUPS ON TWO TESTS

	<i>Total Errors per Test</i>		<i>Wrong on Both Tests</i>	<i>Right First Test and Wrong Second Test</i>	<i>Wrong First Test and Right Second Test</i>
	<i>1st</i>	<i>2nd</i>			
Improved	50	23	20	3	30
Worse	13	17	10	7	3

In addition four objects were presented whose names described their uses, namely, bagpipe, horseshoe, toothbrush, scarecrow.

The patients' responses were recorded simply as right or wrong, and no cues were given.

These patients were then re-tested after an interval of one to seven days, no interim training being given. The same test items were used but they were presented in a different order. To see how consistent their failures were the seven patients have been divided into two groups, namely, (1) those patients whose total number of errors remained the same or were reduced (improved group $N = 5$); (2) those patients whose total number of errors showed an increase ($N = 2$).

Table IV shows the total number of errors for the improved group on both occasions. They made 51 errors on the first occasion and 23 on the second. It will be seen that of these 23 errors, 20 were on items failed on the first test, and only three failures were made on items that had been correctly named on the first test.

Table IV also shows the total number of errors for the two patients who got worse. It can be seen that of the 17 items failed on the second test, 10 had been failed on the first occasion, and seven were failed after being correctly named on the first occasion. Only three items were wrong on the first test and correct on the second.

One patient who was discharged from hospital with considerable improvement in her nominal dysphasia was readmitted three weeks later. A comparison between her first test performances on her first and second admission to hospital shows that she failed 16 out of the 22 test items on both occasions, and all these failures were on the same test items.

Table V shows the proportion of correct responses according to frequency groupings. It will be seen

that there is a positive relationship between frequency and proportion of correct responses. This relationship holds during improvement and deterioration of the patients' naming ability, and indicated that one of the chief factors determining success or failure of naming in dysphasia is the frequency with which a word is used.

DISCUSSION

It has been suggested (Howes and Geschwind, 1961) that in aphasia there is no actual loss of words but rather a shift of the entire set of word frequencies to higher values. It appears that loss of function may be regarded as increased difficulty of evocation, in the same way as a sensory threshold may be raised by certain lesions. Easy words are still the easiest but cannot be uttered in their correct context without a certain amount of reinforcement. Difficult words may not be available at all although they may return spontaneously after a general improvement in the condition of the patient.

The present paper confirms this suggestion and indicates that with improvement of function there is a general lowering of threshold throughout the word pool. Easy words can once again be uttered without reinforcement at all while difficult words need less reinforcement than they did before. Although the dangers of arguing from abnormal to normal function have frequently been emphasized, these findings seem to confirm the now generally accepted conclusion that the role of the cerebral speech areas is in some way connected with availability rather than with storage of words.

In children the same general tendencies are shown as in dysphasia, but the amount gained by a single experience is far greater. Over twice as much is retained by children aged 5 to 7 than by the patients with severe dysphasia at all degrees of difficulty, while the older the child the more he is able to retain.

In severe dysphasia the effect of repetition, while frequently lowering the threshold of a word to immediate reproduction (in the form of perseveration), does not noticeably assist its production in the correct context after a moderately short time interval. Indeed, one of our patients who had failed to name the teeth and the buckle at the first interview was

TABLE V

PROPORTION CORRECT PER FREQUENCY GROUPS

<i>Frequency</i>	<i>Improved</i>		<i>Worse</i>	
	<i>1st Test</i>	<i>2nd Test</i>	<i>1st Test</i>	<i>2nd Test</i>
AA-A	0.8	0.96	0.7	0.8
30-50	0.5	0.75	0.8	0.6
8-20	0.4	0.6	0.6	0.4

told their names and asked to remember them for about 10 minutes. When re-examined he was first asked to name the comb which he called the *teeth* and then the watch which he called the *buckle*. These errors were corrected and the test was continued. When specifically asked to name the teeth and the buckle, the patient could not produce them again without cues. Even the lapse of one week does not seem to cause any major change in the degree of difficulty of a name, which is also seen to be independent of the order in which the objects are presented.

One of the chief causes of a word being 'difficult' in dysphasia is undoubtedly the frequency of its occurrence in general usage. Although other variables may operate against that of frequency in some instances, it is clear that when other factors are eliminated, those object-names which are most commonly used are those most easily produced in organic speech disorders.

The comparative consistency on repeated test performance shown by the dysphasic patients in the present investigation might seem surprising in view of the variability such patients often show in a clinical setting. The discrepancy may possibly be accounted for by the dependence of word-thresholds on many environmental factors which act as cues. In the clinical setting these are seldom carefully controlled, and it may be that variations of performance, where seen, are due to changes in the environment caused unwittingly by the investigator himself.

The very short period for which rehearsal itself is effective in severe dysphasia has already been stressed by Weigl and Kreindler (1960). In one patient whom they studied intensively, the effect of 'deblocking' by reading was shown to follow a rapid deterioration in the course of time. Out of 13 items to be named by the subject, all could be responded to correctly within the first second of rehearsal, only 11 could be responded to 30 seconds later, and only four after 10 minutes. These remarks should not be taken to suggest any criticism of speech therapy in the case of dysphasia. The limitations of simple repetition in this condition have long been recognized (Butfield, 1958), but severely disabled patients can be considerably helped by training in the technique of cueing themselves into difficult words. Moreover, the part played by reassurance, encouragement, and sympathetic understanding in assisting the normal

process of recovery cannot be overestimated (Mitchell, 1958).

SUMMARY

Normal children aged 4 to 11 and dysphasic adults were given two simple object-naming tests. On one of the tests performance was assisted by a set of cues. The main findings were:—(1) Greater learning was seen on the 'easy' than on the 'hard' items in all subjects, but the children gained considerably more than the dysphasics. (2) 'Easiness' is closely related to the general frequency of usage. (3) In severe dysphasia there was slight improvement on all re-testing but significant improvement did not follow practice. The most striking feature was the consistency in the performance of dysphasic patients provided the test conditions remained constant. (4) With general improvement of language function there was a decrease in the number of cues needed to elicit difficult names, while easy names could be given without cues.

The results are taken to suggest that the act of naming an object depends on the threshold of the word and that such thresholds are related to frequency of usage and are raised in dysphasia but may be lowered by a number of factors acting as cues.

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