Letter Recognition Skills Of Aphasic Adults

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This study was designed to explore the efficacy of including a letter recognition task in a test battery for the assessment of aphasia. The authors wondered if such a task yielded sufficient information to make administering the task and interpreting the results an efficient use of clinical time. Specific questions asked were:

1. Which letters of the alphabet are recognized and which letters are identified incorrectly by aphasic patients?

2. Are type and severity of aphasia factors that influence correct letter identification?

3. Which, if any, type of recognition error occurs most frequently in the performance of a letter recognition task - that is, do aphasic patients demonstrate more errors on letters that sound alike (acoustic confusions) look alike (visual confusions) or letters that occupy adjacent positions in the alphabet (adjacent confusions)?

The subjects were 41 aphasic adults from the Kansas City, Missouri and Portland, Oregon Veterans Administration Hospitals. They were classified according to speech fluency and severity of aphasia. Subjects were considered to be either fluent or non-fluent on the basis of procedures described by Goodglass and Kaplan (1972) and moderate or severe based on their overall percentile rankings on the Porch Index of Communicative Ability (PICA) (1967). Subjects with PICA overall percentile rankings of 65 or above were classified as moderate. Those subjects who scored below the 50th percentile were labeled severe. No subject's overall percentile rank was between 50 and 65.

From these classifications four distinct groups emerged: 1) moderate fluent aphasia (N=7); 2) severe fluent aphasia (N=7); 3) moderate non-fluent aphasia (N=14) and severe non-fluent aphasia (N=13).

The Task

The task was presented on 26 white cards. Each card contained seven black letters one inch high spaced 3/4 inch apart. The subject was instructed to point to the letter named by the experimenter. There were seven choices; appearing on each card was the stimulus letter (the correct response) and six foils.

Figure 1. Stimulus card for assessing the letter "T". (Reduced in size from original.)

Three of the foils were selected because of particular attributes. Figure 1 shows the stimulus card in which the item to be assessed was the letter "T". The target letter "T" appears along with letters P, I, U, M, W and F. The letter "P" was selected because of its acoustic similarity to the stimulus letter; "U" because of its adjacent position to T in the alphabet; and "I" because, visually, it resembles the stimulus letter. The remaining foils, M, W, and F were selected randomly. Similar procedures were followed in testing the recognition of the other 25 letters. All letters were randomized for position on each card; the same set of cards was used for each subject.

Scoring

In scoring the responses, 1 point was assigned for each letter correctly identified. 1/2 point was given for a correct response following a repeat requested by the subject.

Results

Table I is a rank ordering by letter of the correct letter identifications for all subjects. These data suggest that certain letters are more likely than others to be recognized by aphasic subjects. For example, the percentage of correct responses for all subjects for the recognition of letters, A and X was 90.29. This was the highest percentage obtained for any letter. A and X were followed by M, V, F, T, W, Z and so on. The letter "S" yielded the lowest percentage of correct responses indicating that "S" was identified incorrectly more often than any other letter.

Fourteen letters are underlined; these are the letters that occupy the first and the last seven positions in the alphabet. Nine out of ten of the

letters identified correctly at least 80% of the time appear in these fourteen positions.

TABLE I. Rank Ordering Of Correct Letter Identifications For Aphasic Subjects (N=41)

Rank	Letter(s)	% Correct
1-2	A,X	90.29
3	M	86.51
4	V	84.15
5-6-7-8	F,T,W,Z	82.93
9	Y	81.70
10	G	80.49
11	Q	79.27
12	C	78.05
13-14	O,R	76.83
15-16	D,E	75.61
17	U	74.39
18-19-20	B,K,N	73.17
21	I	71.95
22	J	70.73
23	P	69.51
24	L	68.29
25	H	67.07
26	S	64.63

Table II shows the distribution of the letter recognition scores by subjects within the various groups. The maximum score for any given subject was 26. These data suggest that letter recognition posed little problem for moderate aphasic patients as a group, regardless of whether the patients were fluent or non-fluent. Letter recognition scores clearly separated the severe fluent aphasic group from the moderate fluent and the moderate non-fluent aphasic groups. Some severe non-fluent aphasics, however, performed almost as skillfully in recognizing letters as those patients in the moderate groups.

Table III shows the percentages of errors for each type of error, that is, for acoustic confusions, adjacent confusions, visual confusions, random errors and no-response errors. It appeared that aphasic subjects were more likely to confuse a letter that was acoustically similar or that occupied a position in the alphabet adjacent to the stimulus letter, than to select a letter that was visually similar to the target letter. Although the percentage of random errors appeared to be high, the opportunity to make a random error occurred three times as frequently as the opportunity to make other types of errors.

TABLE II. Distribution Of Aphasic Subjects' Letter Recognition Scores By Groups (Scores Rounded to Nearest Whole Number).

Score	Fluent Aphasic		Non-Fluent Aphasic	
	Moderate (N=7)	Severe (N=7)	Moderate (N=14)	Severe (N=13)
26	3		5	
25	1		3	1
24			4	1
23	1		1	1
22	1		1	
21				
20				3
19				2
18				1
17				
16				
15	1			1
14		1		
13		1		1
12				1
11		2		
10		1		
9		1		
8		1		1
Group Mean	20.43	10.57	24.68	18.50

TABLE III. Percentages Of Types Of Letter Recognition Errors For Aphasic Subjects

	Type of Error				
	Acoustic	Adjacent	Visual	Random	No Response
Fluent					
Moderate	58%	18%	0%	26%	5%
Severe	25%	16%	6%	41%	11%
Non-Fluent					
Moderate	47%	18%	12%	24%	0%
Severe	48%	10%	54%	34%	3%

Clinical Adaptations

Several observations were made which were considered relevant to the treatment of aphasic patients. The first concerns the error patterns exhibited by patients classified as severe - the severe fluent and the severe non-fluent aphasic patients. The severe fluent aphasics exhibited the greatest number of errors with occasional islands of correct responses. One correct response was usually followed by additional correct responses. On the other hand, severe non-fluent aphasics made predominately correct responses with occasional islands of errors. For these patients, one error was usually followed by more errors.

These patterns may be regarded as valuable signals for the clinician. Consider this example: The patient is responding with a large number of errors - his switch is off. Suddenly, his switch comes on and he begins to respond correctly. At that point, the clinician may want to investigate whether the patient's system can handle more complex materials or a faster rate of presentation of stimuli, etc. Or, the "switch-on" can be a signal to end the session, which, at that time would be ending on a positive note.

On the other hand, consider this example: The patient is responding with predominately correct responses. Suddenly his switch appears to move to the off position - he begins to make errors. At that point, the clinician can initiate changes - use less complex materials or tasks, reduce the rate of presentation, take a break, etc.

Another observation involves the fourteen letters occupying the first and last seven positions in the alphabet. You will recall that these letters were identified correctly at least 80% of the time. Redundancy of the stimulus may have been a factor here. ABCDEFG at the beginning and XYZ at the end of the alphabet may be stored as letter strings, and that may facilitate the recognition of these letters.

It was observed that some patients repeated the stimulus letter before pointing to it. In a sample of approximately one-fourth of the subjects, it was found that patients who produced a large number of correct varbalizations followed these verbal productions with correct pointing responses.

Finally, some examiners have constructed tasks to test letter recognition in which all letters on one card are acoustically similar or visually similar to the stimulus item. It may be that with this arrangement auditory or visual discrimination is being tested, rather than letter recognition, per se.

The authors began this study to determine whether a letter recognition task yields sufficient information to make it worthy of inclusion in a test battery for the assessment of aphasia. Considering the average time taken to perform the task (four minutes) and considering the amount of information obtained in that four minutes of evaluation, the authors believe the task to be an efficient use of clinical diagnostic time.

References

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