

The Assessment of Communicative Competence in Aphasia

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Introduction

Recent studies in psycholinguistics and sociolinguistics emphasize the importance of the investigation of function rather than the form of language. The investigation of function of language entails the study of communicative competence, which is manifested in the proper utilization of speech acts such as making requests, stating denials, furnishing information, relating feelings, and greetings. These speech acts, in turn, can be performed by utilizing different modes of expression such as speech, writing, gestures, and facial expressions in the context of communicative exchange.

Traditionally and currently, the assessment of aphasic language has been approached from the point of view of the evaluation of the form of language as elicited in talking, reading and writing. Very little literature in aphasia reflects an investigation of aphasics talking and communicating in their natural environment; and consequently, no information on communicative competence of aphasics is presently available.

Among currently available tests for measuring types and/or degrees of language impairment in adult aphasics, some tests attempt to localize the site of lesion (The Boston Diagnostic Aphasia Examination); others attempt to identify language patterns which distinguish types of aphasia (The Minnesota Test for Differential Diagnosis of Aphasia) or predict the patient's course of recovery (The Porch Index of Communicative Ability). All of these tests measure language skills didactically. They assume that formal assessment predicts an aphasic individual's ability to communicate in everyday situations that include linguistic and nonlinguistic components. The validity of this generalization has not been tested. Moreover, empirically determined measures of communicative skills of aphasic individuals in natural environments as compared to formally measured language skills are presently unavailable. The only clinical tool designed to provide a quantitative measure of an aphasic individual's ability to participate in various daily activities is the Functional Life Scale (Sarno & Sarno) which consists of ratings based on observation in quantitative terms only.

Purpose

The purpose of this investigation was twofold: first, to establish predictability measures between performances on the Boston Diagnostic Aphasia Examination and functional communication ability in a natural environment and, second, to define specific behaviors or strategies which assist the aphasic individual in compensating for his impairment and communicating in everyday life.

PROCEDURE

Subjects

Twelve aphasic subjects were selected for the study. Seven males and five females, all right-handed, between the ages of 20 and 83, were studied. Etiology of eleven of the patients was a single cerebrovascular accident, while one patient incurred a trauma injury. Eight exhibited right hemiplegia. Only those patients living at home with their spouse or with another family member were included. Six of the patients had varying degrees of apraxia of speech in addition to aphasia. Patients ranged in severity of impairment from mild to severe.

A control group of twelve nonaphasic, non-brain-damaged subjects were matched to the experimental population for age, sex and education. Table 1 shows the descriptive data for the two groups. The mean age for the aphasic individuals was 55.5, as compared to a mean of 56.4 for the normals. The mean education of the aphasic subjects was 12.7; mean education for the normals, 13.0. The mean length of time from onset of the neurological insult to test date for this study was 63.9 months.

TABLE 1. DESCRIPTIVE DATA FOR APHASICS AND NORMALS

MEASURE	APHASICS		NORMALS	
	MEAN	RANGE	MEAN	RANGE
AGE (YEARS)	55.5	20-83	56.4	22-86
EDUCATION (YEARS)	12.7	6-25	13.0	8-25
MONTHS POST ONSET	63.9	7-360	—	—

Materials and Methods

The diagnostic battery administered to the aphasic population consisted of selected subtests of the Boston Diagnostic Aphasia Examination, a questionnaire, and a series of simulated activities designed to assess functional communication.

Specific subtests of the Boston Examination were selected on the basis of their possible usefulness in predicting functional skills. Selected subtests are illustrated in Table 2.

TABLE 2. BOSTON SUBTESTS

1. TAPE RECORDED EXPOSITORY SPEECH SAMPLE
2. FLUENCY
 - a.) ARTICULATION RATING
 - b.) PHRASE LENGTH
3. AUDITORY COMPREHENSION
 - a.) WORD DISCRIMINATION
 - b.) BODY PART IDENTIFICATION
 - c.) COMPLEX MATERIAL
4. NAMING
 - a.) RESPONSIVE NAMING
 - b.) VISUAL CONFRONTATION NAMING
5. REPETITION
 - a.) HI PROBABILITY
 - b.) LO PROBABILITY
6. READING COMPREHENSION
 - a.) WORD RECOGNITION
 - b.) WORD PICTURE MATCHING
 - c.) READING SENTENCE AND PARAGRAPHS
7. WRITING
 - a.) WRITTEN CONFRONTATION NAMING
 - b.) NARRATIVE WRITING

The test was administered in one session at the Callier Center by a speech pathologist. Results were tabulated by three clinicians including the tester. The judges were in complete agreement on 76% of the test items. A one point discrepancy was found on the scoring of 22% of the tasks, a two point discrepancy on 1.7%, and a three point discrepancy on .3% of the items. Sample questions from the questionnaire designed for the present investigation are illustrated in Table 3. The same questionnaire was given to both the aphasic individual and a family member. Each was asked to complete all items independently.

TABLE 3. QUESTIONNAIRE : SAMPLE QUESTIONS

1. DO YOU USE THE PHONE ?
DO YOU ANSWER THE PHONE WHEN IT RINGS ?
DO YOU DIAL THE PHONE YOURSELF ?
DO YOU LOOK UP NUMBERS IN THE PHONEBOOK ?
ARE YOU ABLE TO MEMORIZE SOME PHONE NUMBERS ?
2. DO YOU READ A DAILY NEWSPAPER ?
WHAT PART OF THE PAPER DO YOU READ ?
WHAT MAGAZINES DO YOU READ ?
3. DO YOU WATCH TELEVISION REGULARLY ?
WHAT SHOWS DO YOU ENJOY WATCHING MOST ?
4. DO YOU GO SHOPPING ?
DO YOU HANDLE YOUR OWN MONEY ?
5. DO YOU VISIT WITH FRIENDS ?
DO YOU TALK OR LISTEN MORE ?

To assess functional communication skills, a visit was made to each aphasic individual's home by a clinician and a graduate student. The aphasic individual was told that he would be asked to do a number of things he does every day. The student then proceeded to role play each activity. A script including cues had been previously designed and memorized by the student. The eight simulated tasks are illustrated in Table 4.

TABLE 4. HOME VISIT TASKS

1. CALL FOR TIME AND TEMPERATURE
2. ORDER IN A RESTAURANT AND PAY BILL
3. DEAL WITH DOOR TO DOOR MAGAZINE SALESMAN
4. RELATE DATE AND TIME OF DOCTOR'S APPOINTMENT
5. DEPOSIT CHECKS IN BANK
6. CALL FOR AIRLINE RESERVATION
7. ANSWER PHONE ; RELAY MESSAGE
8. WATCH TV NEWS ; ANSWER QUESTIONS

The clinician recorded all responses throughout the home visit, including nonverbal communication such as gestures and facial expressions. The entire session was tape-recorded.

Administration of the Boston Examination, completion of the questionnaire, and visit to the patient's home were completed within two weeks of one another.

Only the home visit activities were administered to the normal subjects.

Data Analysis

Data analysis consisted of scores given on the Boston Examination, and comparison of responses to questionnaires as given by the patient and his relative. In addition, numerical scores were computed for all responses on simulated activities based on a modified PICA scoring system utilizing a range of 16 points. A description of performance on simulated activities was analyzed in terms of such categories as the modality used to perform the task; for example, was the response verbal, written, or gestural? The linguistic form of the verbal response was taken into consideration; was it a word, a phrase or a clause? Finally, was it a delayed response?

The statistical analysis used in this study was performed utilizing the SPSS statistical package, run under OS/370 at the University of Texas Regional Computing Center in Dallas.

The sub-programs of SPSS used were:

1. nonparametric correlations (rank-order statistics, Kendall coefficients) of the scores on all measures and variables such as months post-onset, severity of impairment, fluency.
2. frequency distribution of raw scores (performance on the Boston Examination and on the simulated activities or home visit) for aphasic and normal subjects.

Results

The statistical analysis revealed the following facts:

1. no significant correlation between Boston total scores and home visit total scores.
2. no correlation between home visit total scores and fluency rating as measured by the expository speech sample on the Boston.
3. no correlation between answers to the questionnaire and performance on tasks related to the questionnaire.
4. no correlation between either the Boston total scores or the home visit total scores and months post onset.
5. the correlation of fluency rating with total scores on the Boston was almost zero.
6. no correlation on home visit task 1, calling for the time and temperature, or task 4, relating the date and time of doctor's appointment, with repetition tasks on the Boston.
7. the following positive correlations were established:
 - a. first, Boston total scores and home visit task 6, making an airline reservation. The correlation here was 73% with a significance at the .001 level.
 - b. a positive correlation between the Boston and task 8 of the home visit, the TV news. The correlation here was 83% with a significance at the .001 level.

- c. the third positive correlation was between the auditory comprehension of complex material subtest of the Boston and task 8 of the home visit, again the TV news; the correlation was 83% with the significance at the .001 level.
8. Using the modified PICA scoring system, the mean performance of the aphasic subjects on home visit tasks was 90.9, with a standard deviation of 18.6; mean performance for the normals on this same task was 112.7, with a standard deviation of 6.4. A comparison of complexity for individual home visit tasks is illustrated in Table 5. Comparison revealed the following:
- task 8, the TV news, was the most difficult for both groups.
 - differential performance can be seen in task 5, the bank deposit, task 6, the airline reservation, and task 8, the TV news, where aphasic subjects performed significantly more poorly than normal subjects.
 - on all other tasks, there was no significant difference in performance between the two groups.

TABLE 5. COMPARISON OF APHASIC AND NORMAL OVERALL SCORES ON HOME VISIT

HOME VISIT TASK	MEDIAN SCORE	
	NORMALS	APHASICS
1. CALL FOR TIME AND TEMPERATURE	12.5	12.2
2. ORDER IN A RESTAURANT AND PAY BILL	15.1	14.8
3. MAGAZINE SALES	12.5	14.8
4. APPOINTMENT TIME	14.8	13.5
5. BANK DEPOSIT	13.8	8.5
6. AIRLINE RESERVATION	14.9	8.5
7. ANSWER PHONE ; RELAY MESSAGE	12.7	12.8
8. T.V. NEWS	10.0	6.0

Table 6 illustrates the comparison of the total raw scores on the Boston with home visit totals. The correlation between the scores occurs only for the three least impaired aphasic subjects, patients 10, 11, and 12.

TABLE 6. COMPARISON OF APHASICS' PERFORMANCES
BOSTON AS COMPARED TO HOME VISIT

SUBJECT NUMBER	BOSTON TOTAL SCORE	HOME VISIT TOTAL SCORE
1	120	82
2	127	81
3	127	65
4	149	77
5	165	107
6	232	88
7	254	96
8	254	78
9	259	70
*10	265	110
*11	278	118
*12	291	119

A comparison between aphasic and normal subjects on home visit tasks is seen in Table 7. Four aphasic subjects performed within the range occurring for the normal subjects, patients 5, 10, 11, and 12. The overall performance of aphasic subjects on the home visit when compared to normal subjects indicates that the functional communication ability of aphasic subjects is relatively good if all modalities of expression are taken into consideration.

TABLE 7. COMPARISON OF HOME VISIT TOTAL SCORES
BETWEEN APHASICS AND NORMALS

SUBJECT NUMBER	APHASICS	NORMALS
1	82	99
2	81	105
3	65	108
4	77	109
*5	107	112
6	88	114
7	96	115
8	70	117
9	70	117
*10	110	118
*11	118	120
*12	119	121

The qualitative analysis of aphasic subjects' performance on the home visit revealed that they resorted to a number of strategies in performing the tasks:

1. nonverbal behaviors such as nodding, pointing, writing the message either on paper or in the air and gesturing were substituted for verbal expressions. Resorting to writing was especially evident throughout all tasks with the two patients who were most severely impaired in expressive function.
2. Smiling behavior took the place of verbal social amenities in face to face interactions. In situations where nonverbal communication such as smiling was not applicable, as on the tasks involving the telephone, the aphasic subjects experienced great difficulty in initiating the verbal exchange.
3. Difficulties in understanding verbal exchanges were signaled by facial expressions of confusion, puzzlement, surprise, or frowning, which in turn led to repetition or cueing by the examiner.
4. In general, delays in response and subvocalizations were followed by successful performance on the tasks.

Finally, analysis of the questionnaire data revealed first that the aphasic individual and family member generally agreed on all questions relating to the patient's communicative and social skills, with the exception of an evaluation of the patient's emotional functioning. The questionnaire also provided us with considerable information on the aphasic individual's lifestyle as well as his communicative functioning. Only one of the aphasic subjects is presently working. All are ambulatory; nine drive. Ten subjects reported that they go shopping, either alone or with their family; eleven engage in social exchanges such as visiting friends or having friends into their homes. In terms of their communicative functioning, nine report listening more than talking; nine of the aphasic individuals answer the telephone themselves. Three of the patients, all in the mildly impaired group, write grocery lists and take phone messages. All report watching television; six watch the news. Ten of the twelve are presently enrolled in speech therapy programs.

Discussion

In interpreting the results of the statistical analysis, the authors feel that the low correlations between scores on the Boston Examination and the home visit could be accounted for by the following facts:

1. small population sample, with wide variability in scores;
2. relatively insensitive scoring system for home visit performance; scores might not adequately reflect observable qualitative differences. For example, responses were scored as successful even when nonlinguistic modalities such as gestures were used.
3. small number of home visit tasks representing distinct linguistic skills such as writing ability;
4. relative ease of tasks even for severely impaired subjects;
5. inability of standardized tests to adequately predict functional communication;
6. considerable range in months post onset in a small population sample.

Interpreting the performance of aphasic subjects on individual tasks, the low scores on task 6, making an airline reservation, and on task 8, the TV news, can be explained by high demands made on auditory comprehension and retention, as well as the complexity of these tasks themselves.

On the other hand, high performance on the remaining home visit tasks could possibly be accounted for by the variety of modalities that were acceptable as correct responses.

We are aware that an aphasic individual's performance on simulated activities may vary from that observed in a real life environment. However, the rationale behind proceeding in this way was to develop a methodology to be used in the next stage of our investigation, the assessment of communicative function in real life environments.

We hope that information on functional communication will be of assistance in formulating prognoses for patients. In addition, for those clinicians involved in decisions about placement when patients are discharged from hospital settings, data on the aphasic patient's ability to function independently is extremely valuable. While aphasia treatment does presently emphasize functional activities, devising a method to look at these skills more diagnostically may further enhance treatment programs for these patients.

The following is a summary of the discussion following the presentation of the paper.

Q: How do you explain the aphasics' success in dealing with magazine salesmen?

A: It depended on what we regarded as a successful response. A gestural response, such as pointing to a particular magazine to indicate a desire to purchase it, was regarded as functional communication. Also, if the aphasic responded with a combination of gestural and telegraphic verbal responses in instances such as detecting an error in the bill for purchase of a magazine, or in expressing an unwillingness to buy anything, the communication was scored positively.

Q: Are PICAs available on these patients?

A: We administered only Bostons.

Q: The reason that I asked is because the percentile rank could be correlated with the scores on your functional language test.

Q: Describe the questionnaire and the techniques used in administration.

A: The questionnaire was modified from the one designed by Aaron Smith at the University of Michigan Speech Clinic. Some of the questions pertained to linguistic functioning such as speaking, reading and writing; some to the patient's life style; for example, is he working? Does he use the phone? Does he watch television?

Q: Do you always ask the questions on the questionnaire verbally?

A: Yes we do; we then ask the same questions independently to the family member. It was surprising to us that in all cases except on those questions pertaining to emotional functioning there was complete agreement between the patient and the family member.

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References

- Goodglass, H., and Kaplan, E. The Boston Diagnostic Aphasia Examination. Boston Veterans Administration Hospital and Aphasia Research Center, Department of Neurology, Boston University. Philadelphia: Lea and Febiger, 1972.
- Porch, B.E. The Porch Index of Communicative Ability. Palo Alto, CA: Consulting Psychologists Press, 1967.
- Sarno, J.E. and Sarno, M.T. The functional life scale. Archives of Physical Medicine and Rehabilitation, 54:214-220, 1973.
- Schuell, H. The Minnesota Test for Differential Diagnosis of Aphasia. Minneapolis: University of Minnesota Press, 1965.
- Smith, A. Aphasia questionnaire. The University of Michigan Speech Clinic of the Institute of Human Development. 1967.