A Comparison of Clinical Tests of Yes/No Questions in Aphasia

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The aphasic patient's ability to answer yes/no questions can be crucial to the patient's functional communication. Some patients' verbal output is so severely restricted that they rely on responses (verbal or motoric) to yes/no questions as a sole means of communication. Other patients are capable of answering other types of questions; however, family and staff members are often less adept than speech pathologists in structuring their own conversational input to maximize the patient's output. Therefore, they often turn to yes/no questions as the major mode of communicating with the patient. The speech pathologist assesses this skill and utilizes this information in contributing to judgements about the patient's comprehension abilities. It is commonly recognized that yes/no responses can be compromised by (1) perseveration; (2) apraxia; (3) inconsistency between facial, verbal and gestures; and (4) lack of identifiable responses. (Critchley, 1970; Kertesz and Poole, 1974.)

Despite these difficulties, the ability to answer yes/no questions is crucial to daily functioning.

Aphasic individuals' responses to yes/no questions are commonly measured on the Boston Diagnostic Aphasia Examination (Goodglass, 1972) by a subtest involving complex ideational material and on the Minnesota Test for Differential Diagnosis of Aphasia (Schuell, 1965) by a subtest concerned with understanding sentences. In this study we compared patient's responses on these two test batteries with the questions on the Western Aphasia Battery (Kertesz, 1974). We measured the effects of stimulus variables of length, semantic content, and truth value on the accuracy of responses.

Description of Tests

(1) The Boston Diagnostic Aphasia Examination complex ideational material subtest consists of four sets of paired sentences containing complex grammatical constructions (i.e., Do two pounds of flour weigh more than one? Is one pound of flour heavier than two?) These questions gradually increase in length from seven to twelve syllables. The second part of this subtest consists of eight sets of paired questions referring to paragraphs read orally by the examiner. The patient must infer the answers from the information in the paragraphs.

(2) The Minnesota Test for Differential Diagnosis of Aphasia understanding sentences subtest consists of fifteen questions ranging in length from five to seventeen syllables. The questions pertain to previously learned information. (Do we get milk from cows?) and some relational questions. "Do you put on your socks before your shoes?"

(3) The Western Aphasia Battery, yes and no task (Appendix) consists of twenty questions ranging in length from four to twelve syllables. Questions one through eight and question twenty pertain to personal information, such as the patient's name and address. Questions nine through thirteen pertain to the patient's immediate environment (are the lights on in this room?). Questions fourteen through nineteen consist of relationships or previously learned information, similar to the former tests. Note that we personalized the test slightly.

Study

All test questions were tape recorded with a rising intonation on the last one or two words and a slightly slower than normal rate of presentation. The recordings were judged to be of equal rate and stress. During testing the examiner would listen to each recorded item through headsets and then repeat the question in live voice to the subject. This provided for increased control of rate and intonation while avoiding increasing the difficulty of the task through direct use of tape recorded material (Boller and Green, 1972).

The order of presentation of subtests was rotated. The examiner and another speech pathologist simultaneously recorded the subject's responses.

A ten-item pretest was administered to ensure that subjects were able to differentiate affirmative and negative responses. The subjects consisted of twelve aphasic patients representing a wide range of severity. Each was diagnosed as aphasic and was being treated in the Speech Pathology Department. Eleven patients had suffered left cerebral infarctions, and one patient had suffered a closed head injury, resulting in a left subdural hematoma and subsequent craniotomy.

Control subjects consisted of six non-brain-damaged patients.

Results

An analysis of inter-test error rate was performed. A two-tailed Wilcoxon t test showed that the Boston Diagnostic Aphasia Examination had significantly more errors than the Minnesota Test for Differential Diagnosis of Aphasia and the Western Aphasia Battery ($p < .01$). The difference in error rate between the Minnesota Test for Differential Diagnosis of Aphasia and the Western Aphasia Battery was not significant (some of our normal controls made errors on the Boston Diagnostic Aphasia Examination). Remarkably, stimulus length did not predict item difficulty beyond five syllables.

In order to examine the effect of semantic content on questions within the same test the questions on the Western Aphasia Battery were divided into three parts: (1) personal information (1-8 and 20) immediate environmental (9-13) and informational questions. On a two-tailed Wilcoxon t test all pairwise differences were significant at the .05 level of confidence. Significantly fewer errors occurred on personal questions; an intermediate number of errors occurred on environmental questions and most errors occurred on informational questions.

The effect of truth value on accuracy was evaluated. Aphasic subjects as a group were less likely to produce errors on affirmative questions. That is, they were more likely to answer "yes" when questions became difficult, as on the Western Aphasia Battery informational questions, all the Minnesota Test for Differential Diagnosis questions, and the Boston Diagnostic Aphasia

Examination non-paragraph questions.

Aphasic subjects were more likely to make errors when the answer was "no" for informational questions (x^2=9.54 df=1 P<.01) but not so for personal and environmental questions, where either answer was equally likely.

Two of the twelve subjects (who also happened to be the mose severely impaired), showed significantly better performance on affirmative questions than on negative questions over all tests (x^2=13.47 df=1 P<.001 and x^2=6.71 df=1 P<.01).

Conclusions and Recommendations

We find that it is essential for the speech pathologist to be able to assist the rehabilitation team members in accurately evaluating the aphasic patient's functional ability to answer yes/no questions accurately. A test like the Western Aphasia Battery, which is sensitive to the broad spectrum of semantic questions, is more appropriate for a population of significantly impaired aphasic patients than the Minnesota Test for Differential Diagnosis of Aphasia and the Boston Diagnostic Aphasia Examination. We therefore administer this subtest routinely and bring the rehabilitation team's attention to semantic content as a factor in question difficulty.

Appendix

Auditory Verbal Comprehension (Kertesz and Poole, 1974)

Yes and No Task

1. Is your name Smith?
2. Is your name Brown?
3. Is your name _____? (real name)
4. Do you live in Toronto? (Miami)
5. Do you live in _____? (real residence)
6. Do you live in Windsor? (Chicago)
7. Are you married?
8. Do you have children?
9. Are the lights on in this room?
10. Is the window closed?
11. Is this a hotel?
12. Is this St. Joseph's Hospital? (Massachusetts Rehabilitation)
13. Are you wearing red pajamas?
14. Will a stone sink in water?
15. Do you eat lunch before supper?
16. Do you eat a banana before you peel it?
17. Does it snow in July?
18. Is a lion larger than a dog?
19. Is a hammer good for cutting wood?
20. Are you a doctor?

References

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Discussion

Q. Why is there a difference in performance with reference to the three part breakdown?

A. I think that we have all observed clinically that aphasic patients can answer yes/no questions with greater accuracy than other types of questions. I really don't know why this phenomenon exists. It could be that, for personal information, the task becomes more like a recognition task. Another interesting phenomenon we have noticed informally, is that severe global aphasic patients can frequently recognize wild absurdities more easily than priorly learned informational questions.

Q. What do you do with the information therapeutically?

A. We use the information as a hierarchy for improving the accuracy of yes/no responses. At our hospital we see many patients that are significantly impaired. With these patients, one of our first goals is to increase the accuracy of yes/no responses.

Q. Did I understand you correctly that your paper showed significantly more errors on the Boston? Do you think that might have something to do with the nature of the stimulus questions on much of the Boston complex ideational materials?

A. Yes, the Boston questions were significantly more difficult for the patients in this study. I do feel this increased difficulty is due to the nature of the questions. The subtest was designed to measure the patient's ability to understand complex ideation, not to measure how accurately he uses yes/no responses; that just happened to be the output modality they chose to utilize. A review of the literature in aphasia does not offer much choice as to measurement of yes/no responses. The only three tests we could locate that use yes/no were the Schuell, the Boston and the Western Aphasia Battery. Our study demonstrated, that given these choices, the 'Western' is advantageous. It offers a range of questions which allows the patient to demonstrate differential abilities.

Q. Comment on order of test presentation.

A. The order of test presentation was alternated between subjects.