

Modification of The Cloze Procedure for  
Measuring Reading Levels in Aphasic Adults

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INTRODUCTION

Virtually every variety of aphasia entails some difficulty in oral reading and reading comprehension (e.g., Gardner et al., 1975). Albert et al., (1981) suggested that this generalized reading deficit varies in degree of severity in terms of vocabulary, length of message, and level of inference required to gain meaning. There is a paucity of information concerning the structure of reading problems and the treatment strategies that they suggest. A more complete understanding of the reading process in individuals with brain damage is clearly indicated.

Most standardized reading tests are designed to measure the abilities of children and normal adults. While these tests can provide useful clinical information, their content and/or design are frequently inappropriate for testing brain-damaged patients. Memory and retention problems, vocabulary reduction, and difficulties following verbal instructions are only three problems commonly exhibited by aphasic persons--problems that can contaminate performance scores (Brookshire, 1977). For example, only a single session is usually required when such standardized tests as the Nelson Reading Test (Nelson, 1962) and The Doren Diagnostic Test of Word Recognition Skills (Doren, 1973) are used with (non-brain-damaged) subjects. However, when examining brain-damaged subjects with these tests, frequently two or more sessions are needed. Many times a lengthy testing experience can be unnecessarily frustrating to the patient and detrimental to his test performance. While reading subtests of aphasia batteries provide the clinician with useful information, they can be limited in scope and may completely overlook features influencing reading. Additionally, these subtests may not provide information pertinent to the unique reading problems of the mildly-impaired aphasic patient.

LaPointe and Horner (1979) published the Reading Comprehension Battery for Aphasia (RCBA), which was specifically designed to test aphasic individuals. This comprehensive, but nonstandardized, test covers a wide range of reading levels from single words through complex paragraphs, even including a section on "functional reading." Van Demark et al., (1980) reported a high test-retest reliability coefficient for the RCBA (.94) and a high validity coefficient of (.80). This reading battery gives the clinician useful diagnostic information. However, the test's overall score has no basis for comparison with established measures such as grade level, and so limits its clinical effect. It appears that this and other problems cause the RCBA to fall short in providing information on reading comprehension problems for some aphasic patients.

A quite different approach, called the Cloze Procedure, can provide the clinician with useful information for assessing and treating reading problems. The Cloze is a procedure used to determine the readability of materials, (grade level), and to measure reading comprehension. The reading passages used in the Cloze procedure have had words systematically deleted. The subject is then instructed to replace them. Three reading levels are obtained; The Independent

level (58% and higher). The material is easy enough to read quickly with maximum comprehension. The Instructional level (44-57% correct). The level at which instruction can be successfully provided. The Frustration level (below 44%). The subject has extreme difficulty in comprehending the material.

Researchers in education have repeatedly demonstrated that the Cloze can be used as an alternative way of assessing reading levels which correlates well with scores derived from conventionally-designed comprehension tests (e.g., Bormuth, 1965, 1966, 1967, 1969; Rankin, 1957, 1959, 1963, 1965, 1969). Further, the test-retest reliability of the Cloze as a measure of comprehension for normal readers is high (.88 as measured by Taylor, 1957, 1969). Rankin (1978, p. 74) offered five points to support use of the Cloze:

- 1 - It samples the degree of "language correspondence" between the text and the reader.
- 2 - It measures comprehension "in process" rather than a product after having read the passage.
- 3 - It measures inferencing as information build-up occurs during the entire course of processing the text information.
- 4 - It samples both predicatable semantic content and the structural properties of text information in a more-or-less random fashion.
- 5 - It affords a test construction procedure that lends itself to precise replication by any test written.

The purpose of this study was to determine whether the Cloze could be used to measure reading abilities in aphasic adults. A slight modification of the Cloze was incorporated to reduce response requirements for the aphasic subjects. The following questions were evaluated, (1) Can a modified Cloze accurately assign a group of aphasic adults to specific grade levels of reading abilities? (2) Can the Cloze assign grade levels for each of the three levels of Independent, Instructional, and Frustration? (3) Does performance on the modified Cloze relate to performance on the RCBA (LaPointe and Horner, 1979) and the PICA (Porch, 1981) and graded reading passages? (4) Can grade levels be assigned to overall RCBA scores on the basis of Cloze performance?

#### METHOD

Subjects. The experimental group was composed of 16 aphasic males with medical evidence of left hemisphere damage, who scored below the 85th percentile on the PICA, and exhibited a PICA score profile consistent with a diagnosis of aphasia. All aphasic subjects were at least one year post onset, demonstrated normal hearing and normal or corrected-to-normal vision, and obtained an overall score of at least 70 on the RCBA. Aphasic subjects ranged in age from 55-71 years (Mean = 61.4). Time post-onset ranged from one to 22 years (Mean = 6.6). Education ranged from 12-19 years (Mean = 14 years). Aphasic subjects' scores for PICA, RCBA, and CLOZE measures are given in Table 1.

The normal control group had no history or medical evidence of neurological involvement. This group was assessed on the Cloze to establish scores of normal behavior for comparison with the aphasic group and were matched for age, sex, and education.

Procedure. All subjects in the experimental group were given three reading measurements: the RCBA, intact passages followed by questions, and the Cloze. The intact passages and the Cloze passages each were approximately 250 words at the primary, first, third, fifth, and eighth grade levels and were taken from

Table 1. Mean scores of PICA overall and reading, RCBA overall, mean and range of CLOZE and Intact (primer - eighth).

PICA %ile					RCBA
	OA		RDG	OA	
MEAN	70.3		80.3	88.18	
RANGE	48-85		64-94	73-99	
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	P	1	3	5	8
<u>CLOZE</u>					
MEAN	79.3	68.9	59.0	56.8	54.2
RANGE	42-96	0-100	0-96	0-98	0-94
<u>INTACT</u>					
MEAN	92.1	67.8	71.4	72.8	78.5
RANGE	80-100	40-90	0-100	0-100	0-100

standardized reading tests (Jackobs and Searfross, 1979; Johns, 1978; Rinsky & Defoussard 1980). Each intact passage was accompanied by ten multiple-choice questions (five factual and five inferential) designed to assess comprehension of the passage.

The cloze consisted of the following. Passages of known grade levels of approximately 250 words were selected. Every fifth word in the passage was deleted and replaced by an underlined blank. The passages were then given to subjects. After a brief training period, the subjects were instructed to write in each blank the word they thought was deleted. No time limit was imposed. Responses were scored correct when they exactly matched the words deleted. Scores were obtained by counting the number of correct responses. A sample of a cloze passage follows.

#### FRANKLIN THE INVENTOR

Many years ago there \_\_\_\_\_ a candle maker Mr. Franklin \_\_\_\_\_ lived in Boston. This \_\_\_\_\_ was a very hard-working \_\_\_\_\_. He had a wife \_\_\_\_\_ seventeen children: the seventeenth \_\_\_\_\_ grew up to be \_\_\_\_\_ very famous man. This \_\_\_\_\_ was mischevious like other \_\_\_\_\_. He was a nuisance \_\_\_\_\_ and got into trouble. \_\_\_\_\_ he studied hard and \_\_\_\_\_ quickly. He did not \_\_\_\_\_ to make his living \_\_\_\_\_ a candlemaker like his \_\_\_\_\_. Instead he wanted to \_\_\_\_\_ a writer, a statesman, \_\_\_\_\_ an inventor. When he \_\_\_\_\_ up he was all \_\_\_\_\_ these things. He helped \_\_\_\_\_ the Declaration of Independence. \_\_\_\_\_ wrote Poor Richard's Almanac. \_\_\_\_\_ invented many things. We \_\_\_\_\_ told he discovered electricity. \_\_\_\_\_ famous man was Benjamin Franklin.

To minimize the effect of naming and writing problems for the aphasic subjects, a multiple choice response format was used with the Cloze in this study. Subjects indicated their choice by circling one of four multiple-choice words. In addition to the correct response, the three foils differed in terms of syntactic and semantic accuracy; that is, semantically correct but syntactically incorrect, semantically incorrect but syntactically correct, and both semantically and syntactically incorrect. The percentage correct was then converted into the three criterial levels previously established by Bormuth (1968) and Cheek and Cheek (1981). A sample of a modified cloze passage follows.

Introduction. This is a story about an Indian boy. In this passage he is trying to return home on his own.

#### Eagle Feather

Eagle Feather saw a man riding a horse. He wanted to ask him (AFTER, BUT, FOR, GIVE) a drink. But he was (YELL, AFRAID, STRANGE, SHOUT) and hid until the man (WAS, WERE, FELL, WALKED) gone.

All day he stayed (OVER, IN, AWAY, INTO) the canyon. He saw a (SNAKES, MOON, CLOUD, SNAKE) lying on the log. He (SMELLED, SEE, SAW, RAN) two young deer playing. They (LIVED, WERE, MADE, WAS) afraid of him.

He came (IN, OVER, OUT, OUTER) of the canyon that night. He (WITH, SEE, SMELLED, SAW) no one.

He did (NO, NOT, WITH, IF) like to be out alone (BLACK, AFTER, AWAY, BEHIND) dark. He thought he could (HEAR, SHOE, SCHOOL, SOUND) witches talking in the trees.

In order to determine whether or not statistically significant relationships existed between sets of variables Spearman Rank Order Correlations, Pearson's Product Movement Correlations, and a regression analysis were calculated.

#### RESULTS

A t-test revealed statistically significant differences between aphasic and control groups on performance on the Cloze ( $p < .01$ ). Each of the 16 subjects was assigned to specific grade levels by the Cloze. Ten subjects achieved eighth grade, one subject achieved 4th grade, three were placed in 3rd grade, and one fell into primary. Correlations between subjects' performance on intact passages and their performance on Cloze passages ranged from .72 ( $p < .01$ ) to .85 ( $p < .01$ ). A strong correlation was found between grade level as determined by the Cloze and the overall score ( $r = .89$ ,  $r_s = .84$ ;  $p < .01$ ).

There was no significant correlation between PICA Overall performance and grade level as determined by the Cloze. However, there was a trend towards a moderate linear relationship ( $r = .54$ ,  $p < .05$ ) between reading subtests V and VII on the PICA and grade levels as determined by the Cloze. A weak correlation was found between grade level as determined by the Cloze and educational level ( $r = .41$ ,  $p < .07$ ). Grade levels assigned to overall RCBA scores were determined via regression prediction analysis. Scores varied predictably all the way down the table. (Table 2).

Analysis of the order of RCBA subtest difficulty for our subjects agreed quite closely with the order reported by Van Demark (1981). (Table 3).

Table 2. Approximate grade levels determined by the modified CLOZE for each RCBA Overall score. Independent levels are given. Instruction would begin 1 grade lower.

RCBA	GRADE LEVEL
100-91	8th and above
90-88	7th
87-85	6th
84-82	5th
81-79	4th
78-75	3rd
74-73	2nd
72-70	1st (Primary)

Table 3. Order of Subtest Difficulty from Least to Most Difficult (N = 16)

Subtest Number	Subtest Title	Subtest Mean Score
2 & 3	Single word confusions - auditory	9.93
	Single word confusions - semantic	9.93
1 & 8	Single word confusions - visual	9.43
	Reading paragraphs - factual	9.43
6	Reading sentences	9.31
5	Synonyms	8.93
9	Reading paragraphs - inferential	8.68
4	Functional reading	8.31
7 & 10	Reading paragraphs	7.0
	Morpho-syntactic reading	7.0

Error analysis of the 16 experimental subjects revealed the following. The three Brocas and one mixed subject had a mean average of 40% more syntactic errors than semantic errors on the Cloze. More lexical errors occurred with verbs, prepositions, articles and adverbs. The ten dysnomic subjects committed an average of 30% more semantic errors than syntactic errors. More errors occurred on verbs than any other word.

### CONCLUSIONS

The present study demonstrates that the modified cloze procedure can be used to obtain an approximate reading grade level for moderate and high level aphasic patients. Our study indicated that subjects' performance on the RCBA and the modified Cloze was predictable. Further, the cloze tests had a moderately high correlation with paragraphs taken from diagnostic reading tests. An investigation determining the reliability and validity of the modified cloze appears appropriate.

Cloze methods could be used with aphasic patients to analyze and treat their reading problems. The modified cloze procedure described in this study would enable clinicians to assign grade levels to a patient's overall score on the RCBA and would provide information important to treatment of patients' reading problems.

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#### DISCUSSION

- Q: I would like to thank you for the useful clinical information that you added to the RCBA data on grade level. I would like to know what your views are on how the "Cloze Procedure" would penalize certain types of patients who exhibit selected characteristic reading disorders as opposed to others. For example, Marshall and Newcomb have suggested that there are patients who present a surface dyslexia as opposed to a so-called deep dyslexia. Do you think that the Cloze Procedure would help you to separate some of these types of reading disorders?
- A: I would think that the Cloze Procedures would be more difficult for individuals who had surface and/or deep dyslexia. There would be problems reading at the paragraph level. In addition to this, the dyslexic patient could have difficulties selecting the appropriate multiple-choice answer.
- Q: Did you get any crossovers? That is, did anyone at the 5th grade reading level have a RCBA score above .84?
- A: Not at the fifth grade level. However, there was one subject who scored 83 on the RCBA and scored 8th grade on the Cloze. This particular subject demonstrated management problems that may have effected his score. Some cells represent the reading performance of single subjects, and so at this point Table 3 is best used as a guide.