# Clozing the Readability Gap

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## Recommended Citation

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## Abstract

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**P**ARDON THE PUN, but there's an improved readability formula — based on the cloze procedure — that will help close the readability gap.

The formula is the work of John R. Bormuth of the University of Chicago. He developed it in 1969, but since it involved complicated computations, it wasn't easy to use until he published tables for it in 1975.

Bormuth's formula has several advantages. The chief one is that it's based on more recent reading norms than the older formulas. For example, Flesch's widely used formula is based on 1925 reading norms. Bormuth's work is based on 1963 norms, a considerable updating.

The formula also has the advantage of both simplicity and accuracy. Its correlation is .81, better than the .77 of the Lorge formula, long regarded as one of the most accurate. And while the Lorge formula requires the use of a word list, the Bormuth formula is based on no more than word length and sentence length. This makes it as easy to use as the Flesch formula, which has a correlation of only .70.

### New Element

The new element in Bormuth's formula is that it's based on the cloze procedure. Ever since 1953, when Taylor introduced the cloze procedure of filling in deleted words in written passages, researchers have been sure it could be developed into a quantitative measure of readability. Bormuth established these quantitative criteria in 1968 and further refined them in 1971.

His studies show that when the number of correct cloze responses drops below 35 per cent, readers learn little or nothing from the material. He also found that a cloze score of 44-45 per cent is equivalent to a score of 75 per cent on a comprehension test and that a cloze score of 52-57 equals 90 per cent comprehension.

Previous work in readability had used 50 or 75 per cent comprehension as the standard for **instructional** level reading at each grade and 90 per cent comprehension as the standard for **independent** level reading.

What this means is that material with a cloze score of less than 35 per cent is too hard for students at that grade level and shouldn't be used. Material with cloze scores from 35 to 55 per cent is suitable for classroom use if the teacher goes over the assignment beforehand and introduces students to the basic concepts and difficult words. If the cloze score is over 55 per cent, students can probably read the material well enough to get most of the content without help.

Within this basic framework, Bormuth has made further refinements, based on differences at each grade level and student interest in the material. He studied cloze responses for grades 3-12 as they related to reading speed, information gain, and students' ratings of the passages. Extremely easy passages with cloze scores of about 90 were read fastest and easy passages with scores of about 80 produced the most information gain. But students disliked passages that were too easy. For testbooks, they liked to read passages with scores from about 35 to 55, with a lot of variation by grade level. Their judgments of difficulty were also low. For textbooks, they thought that passages with scores of about 15 to 25 — again depending on grade level — were most suitable. Bormuth weighted these four factors and combined them into overall criterion scores at each grade level for three types of reading — textbook, reference, and voluntary. These scores are shown in Table 1. At grade 3, the lowest grade studied, word recognition difficulty needs to be considered in addition to cloze scores.

## Using the Formula

The formula predicts the cloze score at three different levels — 35, 45, and 55 per cent — for grades 3-12. To use it, randomly select pages to be sampled and start with the first complete paragraph on the page. Then:

1. Count WORDS. Count to the end of 100 words and continue counting until the end of the sentence that contains the hundredth word. *(Example: 130 words.)*

2. Count the LETTERS in the passage. *(Example: 627 letters for our 130 word passage.)*

3. Count the SENTENCES in the passage. *(Example: 4 sentences for our 130 word passage.)*

4. Find the average number of LETTERS PER WORD. *(Example: 627 letters ÷ 130 words = 4.8 letters per word.)*

5. Find the average number of LETTERS PER SENTENCE. *(Example: 627 letters ÷ 4 sentences = 157 letters per sentence.)*

6. Use Table 2 to determine the CLOZE SCORE AND GRADE PLACEMENT. *(Example: At 4.8 letters per word and 157 letters per sentence, the cloze score is 35 per cent at grade 10.6 and 55 per cent at grade 12.8.)*

## Table 1

### Criterion Scores for Cloze Readability Tests

| Use to Be Made of the Materials | Grade Level of the Student | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Textbook | 59 | 58 | 57 | 56 | 55 | 53 | 52 | 50 | 50 | 49 |
| Reference | 55 | 53 | 52 | 51 | 49 | 48 | 47 | 45 | 45 | 44 |
| Voluntary | 90 | 62 | 54 | 50 | 49 | 46 | 44 | 40 | 34 | 34 |

# Table 2

## Difficulties of Passages in Terms of Grade Placement Scores for Various Combinations of Word Length and Sentence Length

| Letters per Word | Letters per Sentence | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20 | 42 | 64 | 86 | 108 | 130 | 152 | 174 | 196 | 218 | 240 |
| **Criterion Score = 35%** | | | | | | | | | | | |
| 3.4 | 6.3 | 6.8 | 7.5 | 8.0 | 8.3 | 8.6 | 8.8 | 8.6 | 8.3 | 7.9 | 7.5 |
| 3.6 | 6.6 | 7.1 | 7.8 | 8.3 | 8.7 | 9.1 | 9.1 | 8.9 | 8.6 | 8.3 | 7.8 |
| 3.9 | 6.9 | 7.5 | 8.2 | 8.8 | 9.1 | 9.4 | 9.4 | 9.3 | 9.1 | 8.7 | 8.1 |
| 4.1 | 7.2 | 7.8 | 8.5 | 9.1 | 9.4 | 9.7 | 9.7 | 9.7 | 9.4 | 9.1 | 8.5 |
| 4.4 | 7.5 | 8.2 | 8.9 | 9.5 | 9.7 | 10.0 | 10.0 | 10.0 | 9.7 | 9.4 | 8.8 |
| 4.6 | 7.8 | 8.5 | 9.2 | 9.7 | 10.0 | 10.3 | 10.3 | 10.3 | 10.0 | 9.7 | 9.2 |
| 4.8 | 8.1 | 8.9 | 9.5 | 10.1 | 10.3 | 10.6 | 10.6 | 10.6 | 10.3 | 10.0 | 9.5 |
| 5.1 | 8.4 | 9.2 | 9.8 | 10.3 | 10.6 | 10.9 | 10.9 | 10.9 | 10.6 | 10.3 | 9.8 |
| 5.3 | 8.8 | 9.6 | 10.2 | 10.6 | 10.9 | 11.2 | 11.3 | 11.1 | 10.9 | 10.6 | 10.1 |
| 5.6 | 9.2 | 9.9 | 10.5 | 10.9 | 11.2 | 11.5 | 11.5 | 11.3 | 11.2 | 10.8 | 10.4 |
| 5.8 | 9.5 | 10.2 | 10.8 | 11.1 | 11.5 | 11.6 | 11.6 | 11.5 | 11.4 | 11.1 | 10.7 |
| **Criterion Score = 45%** | | | | | | | | | | | |
| 3.4 | 7.8 | 8.4 | 9.0 | 9.3 | 9.7 | 9.8 | 9.9 | 9.8 | 9.6 | 9.2 | 8.8 |
| 3.6 | 8.1 | 8.7 | 9.2 | 9.6 | 10.0 | 10.1 | 10.2 | 10.1 | 9.9 | 9.5 | 9.1 |
| 3.9 | 8.3 | 9.0 | 9.5 | 9.9 | 10.3 | 10.4 | 10.5 | 10.4 | 10.2 | 9.8 | 9.4 |
| 4.1 | 8.6 | 9.2 | 9.7 | 10.2 | 10.6 | 10.7 | 10.8 | 10.7 | 10.5 | 10.1 | 9.7 |
| 4.4 | 8.8 | 9.5 | 10.0 | 10.5 | 10.9 | 11.0 | 11.1 | 11.0 | 10.8 | 10.4 | 10.0 |
| 4.6 | 9.1 | 9.7 | 10.3 | 10.8 | 11.2 | 11.3 | 11.4 | 11.3 | 11.1 | 10.7 | 10.3 |
| 4.8 | 9.3 | 10.0 | 10.6 | 11.1 | 11.5 | 11.6 | 11.7 | 11.6 | 11.4 | 11.0 | 10.6 |
| 5.1 | 9.6 | 10.3 | 10.9 | 11.4 | 11.8 | 11.9 | 12.0 | 11.9 | 11.7 | 11.3 | 10.9 |
| 5.3 | 9.9 | 10.6 | 11.2 | 11.7 | 12.1 | 12.2 | 12.3 | 12.2 | 12.0 | 11.6 | 11.2 |
| 5.6 | 10.1 | 10.9 | 11.5 | 12.0 | 12.4 | 12.5 | 12.7 | 12.5 | 12.3 | 11.9 | 11.5 |
| 5.8 | 10.4 | 11.2 | 11.8 | 12.3 | 12.8 | 12.8 | 13.0 | 12.8 | 12.7 | 12.2 | 11.8 |
| **Criterion Score = 55%** | | | | | | | | | | | |
| 3.4 | 9.3 | 9.8 | 10.2 | 10.6 | 10.8 | 10.9 | 11.0 | 10.9 | 10.8 | 10.5 | 10.1 |
| 3.6 | 9.5 | 10.0 | 10.4 | 10.8 | 11.1 | 11.2 | 11.3 | 11.2 | 11.0 | 10.8 | 10.4 |
| 3.9 | 9.7 | 10.2 | 10.7 | 11.1 | 11.4 | 11.5 | 11.6 | 11.5 | 11.3 | 11.0 | 10.6 |
| 4.1 | 9.9 | 10.4 | 10.9 | 11.3 | 11.7 | 11.8 | 11.9 | 11.8 | 11.6 | 11.3 | 10.9 |
| 4.4 | 10.1 | 10.7 | 11.2 | 11.6 | 12.0 | 12.1 | 12.2 | 12.1 | 11.8 | 11.5 | 11.1 |
| 4.6 | 10.3 | 10.9 | 11.4 | 11.8 | 12.3 | 12.4 | 12.5 | 12.4 | 12.1 | 11.8 | 11.4 |
| 4.8 | 10.5 | 11.2 | 11.7 | 12.1 | 12.6 | 12.7 | 12.8 | 12.7 | 12.4 | 12.1 | 11.6 |
| 5.1 | 10.8 | 11.4 | 11.9 | 12.4 | 12.9 | 13.0 | 13.1 | 13.0 | 12.7 | 12.4 | 11.9 |
| 5.3 | 11.1 | 11.7 | 12.3 | 12.7 | 13.2 | 13.3 | 13.4 | 13.3 | 13.0 | 12.7 | 12.2 |
| 5.6 | 11.3 | 11.9 | 12.6 | 13.0 | 13.5 | 13.6 | 13.7 | 13.7 | 13.3 | 13.0 | 12.5 |
| 5.8 | 11.6 | 12.3 | 12.9 | 13.3 | 13.8 | 14.0 | 14.0 | 14.0 | 13.7 | 13.3 | 12.8 |

## Discussion

Even though this is one of the most accurate formulas, the precise decimal point results should not be misconstrued. The standard error for a single sample is 0.8 grade. Using two or more samples and averaging the results will decrease the chance of error.

The formula is based on **letters** per word rather than the more familiar

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**syllables** per word. Bormuth made this change to avoid the problem of judging the number of syllables in a word. If more than two samples are used, the number of letters can be estimated, using the average number of letters per line in the first two samples. Partial lines at the beginning and end of paragraphs still need to be hand counted.

Theoretically, the 45 per cent cloze scores ought to give grade placements roughly equal to the Flesch formula, and the 35 per cent cloze scores ought to give grade placements roughly equal to the Dale-Chall formula. (The Flesch formula is based on 75 per cent comprehension; the Dale-Chall on 50 per cent.)

Formula users have been accustomed to adding two grade levels to the score to predict out-of-school reading ability. If you use Bormuth's 55 per cent cloze scores, you don't need to add anything to the result. This factor is already built in and is essentially the difference between the 35 or 45 per cent level and the 55 per cent level.

However, Bormuth based his work on the *California Reading Test,* and it gives scores that are about a year higher than other tests. So for most purposes you should subtract a year from the grade placements shown in Table 2.

**A Word for Skeptics**

Some people think that formulas that predict readability are complete nonsense; others think that while they may be all right for school use, they have little to do with adults. I refer disbelievers to Klare's 1963 overview of readability. He cites 32 studies of written material using a variety of modern comprehension formulas; of these, only 6 studies fail to show positive results in reader preference, readership, reading speed, or what was learned. A number of these studies were done with adults, including Murphy's split run tests of articles in *Wallaces Farmer.*

**References**

Bormuth, J. R., "The Cloze Procedure: Literacy in the Classroom," in W. D. Page, ed., *Help for the Reading Teacher: New Directions in Research,* ERIC Clearinghouse on Reading and Communications Skills, National Institute of Education, Urbana, Illinois, 1975.

_____ , *Development of Standards of Readability: Toward a Rational Criterion of Passage Performance,* USOE Technical Report No. 9-0237, U.S. Office of Education, 1971.

_____ , *Development of Readability Analyses*, USOE Technical Report No. 7-0052, U.S. Office of Education, 1969.

_____ , "Cloze Test Readability: Criterion Reference Scores," *Journal of Educational Measurement*, 5:3 (1968) 189.

Klare, G. R., "Assessing Readability," *Reading Research Quarterly*, 10 (1974) 62.

_____ , *Measurement of Readability*, Iowa State University Press, Ames, Iowa, 1963.

Murphy, D. R., *What Farmers Read and Like*, Iowa State University Press, Ames, Iowa, 1962.

Taylor, W. L. "Cloze Procedure: A New Tool for Measuring Readability," *Journalism Quarterly*, 30 (1953) 415-33.

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She received the Pioneer ACE Award in 1967 and has been chairman of the AAACE publications committee, a member of the board of directors, and most recently was in charge of the Tahoe workshop.

Sherrill has an M.A. from the University of Minnesota, 1956, and a B.S. from Oregon State University, 1954.

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