

9 What Every Educator Should Know about Reading Research

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The ability to read well is no longer something which college instructors take for granted in their students.¹ Most of us have noticed that the textbooks we use seem to get easier every year, but our students seem to have more and more trouble reading them.² Since reading is comprehension, students who cannot acceptably reconstruct the author's main idea, supporting ideas, and supporting facts, as well as make some critical evaluation of these things, cannot read for the purposes of the course, regardless of what types of material they read outside of class.

Many reasons exist for the inability to read a particular item. Sometimes the reader lacks sufficient background to properly interpret a particular item. Sometimes the information required for a particular reader to comprehend is missing. Sometimes a reader lacks the strategies necessary to read even the most elementary material acceptably. But for whatever causes, reading failure—the lack of understanding or misunderstanding of the author's literal or implied message—is a source of continual dismay for both student and instructor. Since reading is intimately entwined with the content of each academic class, all instructors must be concerned with the reading abilities of their students. Yet many instructors feel unsure of their abilities to teach reading in their classrooms. The purpose of this chapter is to acquaint teachers with the fundamentals of reading research in order that they may more confidently and effectively guide their students' learning.

What Reading Is and Is Not

Reading is the understanding of a message which has been encoded in a graphic display; in English the graphic display is printing or writing. Although reading is often defined as the decoding of letters into sound, it is not. A reader may, for example, know the sound-to-letter relationships in Spanish and be able to orally reproduce a

Spanish paragraph perfectly, but be unable to explain what the paragraph means. Often an inverse relationship exists between comprehension and perfect oral reading. Evidence indicates that in some cases comprehension actually precedes decoding. Many people, for instance, recognize the meaning of words long before they attempt to decode the letters into sound—that is, pronounce them.³

The information readers bring to what they read must therefore play an important part in how well they understand what they read. The “behind-the-eye” information may contribute as much as three-quarters of the information necessary to understand a passage.⁴ If, for example, I wrote the sentence, “It is unlucky to have a black _____ cross your path,” most people would not need to see the letters *C-A-T* to know that cat is the missing word. If, however, I wrote the sentence, “Michigan Technological University’s best athletic team is its _____ team,” most MTU students would not need the missing word to understand the meaning of the sentence because they know this particular fact: Michigan Tech has historically had excellent hockey teams. Students at colleges whose teams compete against Michigan Tech would probably be able to supply the missing word, too, though not as quickly or with as much assurance. Students at schools which do not have hockey teams, or students who have no interest in collegiate hockey would have the hardest time of all, and would need the missing word to get the correct meaning of the sentence. The more information a reader already has, the less information need be encoded in the actual passage.

The more the reader knows, the easier it is to fill in missing information, to pick up inferences, and to locate main ideas. One way of describing this process is to say that readers read to confirm or disprove what they already know; reading can be described by the phrase, *the reduction of uncertainty*.⁵

What Happens When a Reader Reads (Or Fails to Read)

Readers rely on various language cues while reading. In reading all textual materials, good readers simultaneously use cues available in the syntactic (grammatical) structures of the passage, the grapho-phonetic system (the relationship of written symbols to sound), and the semantic (meaning) system. Moreover, in their search for a correct reconstruction of the author’s message, good readers constantly ask themselves, “Does this make sense?” If momentarily thwarted, successful readers stop, check, and recheck all three cueing systems for further help.⁶

Consider, for example, the mystery novel. The reader reads it to answer the question, “Whodunit?” To find the solution to the murder

and reduce the uncertainty, the reader is likely to hypothesize and test hypotheses along the way. This same operation happens in less obvious ways as well. Research shows that good readers continually ask questions and test hypotheses as they read all kinds of materials, using language signals left by the author to prompt a change in their hypotheses. Imagine the following sentence is from a paragraph on animal behavior:

Lemmings do not march to the sea and throw themselves over the cliffs in mass suicide.

One word, *not*, makes all the difference in the sentence's meaning: a reader reading with the preconceived idea that lemmings *do* throw themselves into the sea is likely to completely misunderstand the sense of the sentence. A writer who wishes to make the meaning clear recognizes that the readers read with preconceptions and should give signals to mark a divergence from what the reader probably already believes:

Contrary to popular opinion, lemmings do not march to the sea and throw themselves over the cliff in mass suicide.

Lemmings do NOT march to the sea and throw themselves over the cliff in mass suicide.

Although many myths have developed around the supposedly suicidal behavior of lemmings, lemmings do not in fact throw themselves over cliffs in efforts at mass destruction.

Words and phrases like *contrary to popular opinion*, the emphatic *NOT* as opposed to the simple *not*, *although many myths have developed*, *supposedly*, and *in fact* are redundant signals to readers that their expectations are not likely to be met, and that they had better slow down to receive some new information.

Even so, readers often find passages too difficult for them for several reasons. They may lack the background (the "behind-the-eye") information that the author assumes they will have before reading the material. This may be a quite reasonable assumption on the author's part, as when he or she presumes the reader will have undergone certain preparation before reading the text. But if an author makes the assumption unadvisedly, then he or she may not supply enough signposts to meaning in the forms of grammatical structure, semantic context, intermediate steps in reasoning, or background facts to allow the readers to form intelligent hypotheses about the author's principal and secondary ideas. The author may not explain specialized vocabulary clearly enough, or may not develop complex concepts in carefully defined or logically related steps. Such written material might be fine

for advanced or even average students, but for the very poor student it will represent an insurmountable obstacle. The expert in the field (the instructor) often knows very little about what the beginner brings in the way of background. Since the expert already possesses more than enough “behind-the-eye” information to make logical connections, textbooks are often chosen without adequate understanding of the barriers the novice will encounter when reading them.

People assessing how readable a text is usually equate long sentences with difficult reading and short sentences with easy reading,⁷ but it seems not so much to matter how long sentences are, but rather how *predictable* they are. Thus short, terse sentences packed with technical vocabulary which are not set in a redundant context—a context which repeats enough information to be predictable—will be more difficult to read than will a very long, grammatically complex sentence in which the words are familiar and the order predictable.⁸

Read, for example, the following written versions of the same information:

1. Cross-modal transfer and ipsimodal stimuli facilitate comprehension.

2. Most people will comprehend more if what they learn is presented through a variety of modes. (Modes are simply the means by which perceptions are transmitted: vision, hearing, touch, and muscular movement.) Many children do seem to prefer one mode over another, as in the case of the child who easily learns to play the piano by ear (the aural mode), but who has difficulty playing from written music (the visual mode). In most cases, however, children benefit from receiving information through a variety of senses. Information can also sometimes be presented in different forms of the same mode, as when a written story contains a picture illustrating an event described in the story. In this case, the written words and the picture represent *ipsimodal stimuli*: two reinforcing forms of the same (visual) mode.

The second passage is clearly more understandable to the novice in educational psychology than is the short sentence in the first version. Although the second passage contains far more syntactically complex sentences, the first sentence is the most difficult, paradoxically, because of its compact, declarative form which does not provide the background necessary for a beginner to understand it. An expert would likely become impatient with the laborious explanation in the second passage. Readers' ability to master the first sentence should grow as they become more proficient in the subject matter and as they gain more experience as readers.

The Three Levels of Reading Comprehension

More, however, is required of a successful reader than simple, factual comprehension. *Literal* comprehension must accompany the ability to see the implied relationships between fact, information, and the ideas of the author, and this *interpretive* or *inferential level* of comprehension should, in turn, lead to the most sophisticated reading level—the *applied* or *critical level*.⁹ *Literal* reading is easy compared to the other levels, yet the reader must master it to reach the other two levels of understanding. Most college instructors assume that students are capable of these higher levels of thought without realizing that most of them do not even read for more than the main idea and a few supporting facts, that often they misunderstand the main idea or oversimplify it beyond recognition, and that they cannot organize the supporting facts rationally. Many students are simply unable to achieve literal comprehension. An instructor who begins discussing applications of a reading without making certain that the students understand the factual content is asking for trouble.¹⁰ Requiring students to keep reading notes in a notebook throughout the course is one way to monitor and encourage at least literal comprehension.

Lucille Strain shows that readers demonstrate mastery of *literal* comprehension by doing such things as:

1. Identifying appropriate meanings for words in a selection
2. Following directions
3. Recalling sequences of events or ideas
4. Locating answers in the text to specific questions
5. Summarizing the main idea of a selection
6. Associating the text with pertinent illustrations
7. Following the sequence of the plot
8. Identifying ideas

Readers demonstrate that they are deriving *interpretive* or *inferred* meaning by:

1. Drawing logical conclusions
2. Predicting outcomes
3. Describing relationships
4. Suggesting other appropriate titles for the passage
5. Identifying the implied traits of a character¹¹

Without denying the importance or difficulty of gathering, processing, and ordering information, a reader's true task is often more than these processes. Readers must confirm more than their correct

perception of the author's literal and implied message. The reader must know "when to select material, how to select it, and how to determine its reliability."¹² These abilities belong to the ability to think and read critically. *Critical reading*, the correct assessment of written statements,¹³ still relies on the fundamental application of confirmation or rejection by testing, verifying, and applying.¹⁴

Reading Questions

When initially assigning reading material, instructors can help students comprehend the assignment on all three levels if the instructor asks questions which require evidence of *literal*, *interpretive*, and *applied* knowledge. These questions—whether handed out in written form, or given more casually as points to think over while reading—should emphasize more than literal comprehension, particularly in college classes, although the instructor should include questions about important or often misunderstood facts. (For example, "What common misconception exists about lemmings?")

The instructor may require the answers to be written down and handed in or simply noted in the text. Under no circumstances should the student copy the answer directly from the textbook, or underline the pertinent passage in the text. Instead, the reader should rephrase the answer in his or her own words, since to rephrase the answer in one's own language requires the *decoding* of information, while copying or (worse) underlining it merely identifies the information. If we read the sentence "*The foziwugs skittered sasambly autoy,*" we would presumably have little difficulty with the question "What did the foziwugs do?" by writing the sentence "They skittered sasambly autoy." Of course they did; the syntax of the sentence makes that perfectly obvious; but if we were required to explain the action in our own words, we would be forced to contemplate the actions of foziwugs far more seriously.

College students usually try to do what the instructor wants. If they believe the instructor requires memorizing facts, they will memorize facts; if they believe they must read only for vaguely-formed main ideas, they will do that; if they believe that the instructor consistently expects a firm grasp of factual information, and wants that information to be interpreted and applied in a mature manner, they will try to achieve that. Instructors, of course, must devise questions which will develop their ability to generalize from facts. A good rule of thumb when devising questions is to consider Strain's behavioral evidence of comprehension and use the following general questions as guidelines:

What is happening? Why is it happening? How does it apply to other concepts we have studied?

Weaver and Shonkoff¹⁵ have shown that an instructor who asks questions requiring inference and application does promote a deeper understanding of the subject on the student's part. (Students appreciate reading questions- if my own experience is any clue.) We would like to think that all this work on the instructor's part to devise significant questions would help the average student to invent superior questions for reading. This is not the case, however. Research shows teachers' questions are significantly superior to students' questions in improving reading and course comprehension.¹⁶ This was true even when students received special question-asking instruction, when they had studied the subject for a considerable time, and when the evaluator was not the person originally posing the questions. The key, it seems to me, is the teacher's foreknowledge of what will *later* be significant versus the students' necessarily more limited perception. Students, as they become more expert in a particular subject, should slowly improve in their ability to pose significant questions, but teachers play a vital-and often unrecognized- role in guiding their students to improved reading comprehension.

Testing

Why has a student failed to read material adequately? Frequently, instructors want to send a problem reader over to the school's reading lab for "some kind of test" which can quantifiably determine what is wrong. Instructors should realize that most reading tests are hardly the precise, scientific measurements that outsiders assume them to be.¹⁷ The word *diagnostic* implies that these tests will tell the instructor what is wrong; the word *achievement* suggests that they will accurately gauge students' abilities. In other words, the test should indicate more than just that Jane Jones is reading on the "5.4 level." It should point out that she has a poor ability to predict syntactic structure, a low comprehension of fiction, a better comprehension of factual material, and doesn't know what to do when she gets stuck on an unknown word. Most tests will not come close to diagnosing a student's problems or accurately assessing a student's achievement.

Achievement tests and most diagnostic tests break the reading process into a group of subskills or separate skills that a reader uses to decode the words on the page. These subskills are usually identified as rate (speed in words-per-minute), word-attack (the ability to read familiar and unfamiliar words aloud, using the related skills of phonics

and syllabication), phonics (the relationship of the printed alphabet to sound, involving the knowledge of so-called “long” and “short” vowel sounds, consonant blends, vowel digraphs, and initial and end consonants), syllabication (the ability to break unfamiliar words into syllables), vocabulary, and structural analysis (the ability to put words together using roots, prefixes, and suffixes). Comprehension is usually listed as merely one of several subskills.

The trouble with isolating and testing for individual subskills, with comprehension simply one of a group, is that these skills are not used in isolation. They depend on each other, and thus a reading test can't accurately examine abilities separately. For example, read this word:

read

When you read it, did it sound like *red* or *reed*? You had no way of knowing which was the correct pronunciation. What about your pronunciation of the word the other times it appeared?

For example, *read* this word . . .

When you *read* it, did it sound like . . .

You had no trouble with these words because you knew the context of the sentence. In other words, your skill in word-attack, vocabulary, and even structural analysis directly depended upon your ability to use context clues, even when you knew what the word meant. If a reading instructor prescribed a reading program in phonics or vocabulary based on your failure to read the isolated word *read* correctly, she or he would ignore the real reason for your difficulty—the fact that you did not know the correct context. Such a fact may seem obvious to the general observer, but it flies in the face of the numerous reading tests which require students to identify isolated words.¹⁸ These include the most popular and commonly used diagnostic and achievement tests, such as *The Gates-MacGinitie Reading Tests* for reading grade levels 1 through 9, *The Diagnostic Reading Tests: Upper Level* for grade levels 7 through 13, and the most commonly used college reading achievement test, *The Nelson-Denny Reading Test: Vocabulary-Comprehension-Rate*, for grade levels 9 through 16 and beyond. All give words in isolation, in spite of overwhelming evidence against the validity of this practice, evidence which has been mounting since H. L. Smith's (1956) *Linguistic Science and the Teaching of Reading*.¹⁹ Most of the major reading tests, however, were written before the recent research into reading began in earnest. The Nelson-Denny test, for instance, first appeared in 1924, with only cosmetic changes made in a 1960 revision.

There are other problems. Most reading tests contain gross statistical fallacies: such as norming over diverse populations; using statistically insignificant score variations to raise or lower grade level placement by several months; “proving” the validity of new tests by comparing their statistical results with older, similarly constructed and “proven” tests; averaging comprehension and subskills tests together; and lumping all of the tests’ results into a single grade-level placement.²⁰

Are standardized diagnostic and achievement tests worthless, then? No, indeed. They can quickly locate poor readers who then can be referred for more sophisticated testing. Recently a new kind of test, an individual reading inventory, has been devised; it can give a trained interpreter a detailed analysis of the effectiveness of the actual strategies used by readers.²¹

There are, moreover, quick and easy ways for classroom teachers to predict the ability of a particular student, to read actual materials assigned in a particular class, tests called *cloze procedures*, which can help an instructor to easily identify problem readers on the first day of class.²² The cloze procedure is a method designed to determine how readable a text is for a specific person. We have seen that the difficulty of a certain text depends on the background of the reader, as well as his or her ability to predict and confirm information using the passage’s grammatical structure and context. The cloze procedure requires the reader to demonstrate all these abilities.

The instructor hands out a fairly self-explanatory passage of approximately 260 words from the textbook to be used in the course. The passage should be one the students have not seen before.²³ The first sentence of the passage is reproduced in its entirety. From there on, every fifth word is deleted (or eighth, or tenth, or whatever the instructor chooses) and a blank of equal length substituted, to a total of fifty blanks. The final sentence is left intact. Students then attempt to fill in the blanks, using a pencil. Many students find the cloze a frustrating experience, even when they score well. The instructor should encourage them not to give up, but to use the passage’s context clues to guess appropriate words, and to go back to change words as many times as they wish. (Thus the need for pencils.) Allow sufficient time for as many as possible of the students to finish, usually at least thirty to forty-five minutes.

Grade the passage. Scholars who use the results of the cloze for research purposes accept only the exact word, not close synonyms; but for practical classroom purposes, very close synonyms are good enough. Students with scores of less than 40 percent will find the textbook too difficult to learn from, and should be referred to a reading professional,

given a simpler text, or advised to take an easier course. Students receiving scores of between 40 and 90 percent will find the textbook easy enough to read, but still challenging enough to learn from. Students scoring over 90 percent already seem to know what is in the textbook, and are likely to be bored by it; they should be required to read a more sophisticated book, or to enroll in a more advanced course.

Here is an example of a cloze procedure:

Many so-called "vocabulary skills" are really comprehension skills. Vocabulary is obviously important (1) _____ reading comprehension, but because (2) _____ the principles behind reading (3) _____ discussed earlier, it is (4) _____ important or necessary for (5) _____ student to understand every (6) _____ word in a passage. (7) _____ words can often be (8) _____ out by using context (9) _____ and a tutor should be (10) _____ to give help in (11) _____ these clues.

Using context (12) _____ simply means that the (13) _____ is told what the (14) _____ means by the words (15) _____ phrases that surround the (16) _____ word. For instance:

Clementine (17) _____ her new chapeau on (18) _____ head, noticing how its (19) _____ lines set off her (20) _____.

Chapeau means "hat," and (2X) _____ context clues are given (22) _____ let the reader know (23) _____. Sometimes the reader must (24) _____ longer for the information:

(25) _____ woman loved Rapunzel better (26) _____ anything else. [No clue (27) _____ to the meaning of (28) _____.] She swore she must (29) _____ some for each meal. [(30) _____ must be something to (31) _____.] So she insisted that (32) _____ husband to go each night (33) _____ the witch's garden to (34) _____ it [Rapunzel must be (35) _____ kind of vegetable or (36) _____.] and each night he (37) _____ enough for her to (38) _____ a leafy green salad (39) _____ day. [Rapunzel must be (40) _____ lettuce or spinach.]

If (41) _____ took the time to (42) _____ up the meaning of (43) _____ in the dictionary, we (44) _____ find the synonym *rampion*- (45) _____ not too helpful fact, (46) _____ by noting the context (47) _____ the word, we found (48) _____ much more than we (49) _____ have found in the (50) _____, and in less time. (See note 24 for correct answers.)

Stress context clues to your students.

Speed Reading

We turn now to a consideration of what most people equate with “reading improvement”- speed reading. Advertised claims to the contrary, there is no proof that the faster one reads, the more one comprehends.²⁵ In fact, increased comprehension usually leads to increased reading speed, not the other way around; thus comprehension should always be the chief focus of any reading improvement efforts.

Actual speed is not as important as the appropriateness of that speed to the material being read. Consider the following instance: a reader rushes through an introductory surgery textbook in an hour. Is that good? Suppose the reader is a medical student. The reader will at best learn only the main ideas of the text- insufficient, we would think, to give the student enough information to perform surgery. But suppose the reader is an experienced professor of surgery who is considering textbooks for a course. In this latter case, such a reading technique is not only proper, but advisable, since slow, careful reading would be a waste of time, and would not likely provide the overview the reader requires.

Improving comprehension is usually the main goal of any course. Therefore, all reading instruction should be directed at improving a student’s understanding of the appropriate written material. It’s far easier, however, to accurately measure and condemn reading speed than it is to gauge comprehension, and it is much easier to talk about the principles behind increasing reading speed than it is to work on comprehension.

Readers must work at good comprehension. It does not come with machines or kits. Readers must pose questions and form hypotheses. A good reader reads to answer questions. When background information is confusing or unavailable, the good reader slows down, identifies what kind of information is missing, looks it up, asks someone in a position to know, or correctly decides that the effort is not worthwhile at the present time.

Good reading is the interaction of two minds- the writer’s and the reader’s. Good teachers do all they can to encourage the most active interaction possible.

Notes

1. This introduction to reading theory and practice is fundamentally psycholinguistic in approach; that is, it views reading as a process resulting from the interactions between the brain and language of the reader and the brain and language of the author. Psycholinguistic analysis of reading is not in itself a

way of teaching reading, but rather a body of knowledge about the brain, language, and reading with some obvious implications for teaching. This approach to understanding how people read is not new, having been suggested as early as 1937 by Ernest Horn [*Methods of Instruction in the Social Studies* (New York: Scribner's), p. 154.] but it achieved its present form during the merger of cognitive psychology and linguistics in the 1960s. Specific descriptions of reading based on observed linguistic cues used by readers had been published by 1963, and were well known by 1965 [Kenneth S. Goodman, "A Communicative Theory of the Reading Curriculum," *Elementary English* 40 (1963): 290-298; "The Linguistics of Reading," *The Elementary School Journal* 64 (1964): 356-361; "A Linguistic Study of Cues and Miscues in Reading," *Elementary English* 42 (1965): 639-643]. Frank Smith's *Understanding Reading: A Psycholinguistic Analysis of Reading and Learning to Read* (New York: Holt, Rinehart and Winston, 1971) followed the outpouring of research and publication in the late sixties. It made available to the novice Smith's investigations of the relationships between reading and language, as suggested by the work of such linguists and cognitive psychologists as Jerome S. Bruner, Noam Chomsky, and George A. Miller. Smith followed in 1973 with *Psycholinguistics and Reading* (New York: Holt, Rinehart and Winston), a collection of essays which in effect summarized the discipline for the nonspecialist. In his preface to this book, Smith lamented that "psycholinguistics" had even then found its way into the jargon of educators, with the intellectual cheapening and misunderstanding that usually accompanies fashionable approaches to education. For that very reason, I believe that the novice whom Smith has interested in psycholinguistics is better served by beginning further exploration in the field, not in the numerous popularizations available for teachers, but in the parent fields, beginning with such general introductions as Ulric Neisser's *Cognitive Psychology* (New York: Appleton-Century-Crofts, 1967) and *Cognition and Reality: Principles and Implications of Cognitive Psychology* (San Francisco: W. H. Freeman, 1976), before moving on to application of these theories in Frank Smith's *Comprehension and Learning* (New York: Holt, Rinehart and Winston, 1975). Good introductions to applied linguistics and reading can be found in Kenneth Goodman's *Miscue Analysis: Applications to Reading Instruction* (Urbana, Ill.: NCTE, 1973) and *The Psycholinguistic Nature of the Reading Process* (Detroit: Wayne State University Press, 1968); P. David Allen and Dorothy J. Watson's *Findings of Research in Miscue Analysis* (Urbana, Ill.: NCTE, 1976); Richard E. Hodges and E. Hugh Rudolf's *Language and Learning to Read* (Boston: Houghton Mifflin, 1972); E. Brooks Smith, Kenneth S. Goodman, and Robert Meredith's *Language and Thinking in School*, 2nd ed. (New York: Holt, Rinehart and Winston, 1977); and Constance Weaver's *Psycholinguistics and Reading: From Process to Practice* (Englewood Cliffs, N.J.: Winthrop, 1980). Many selections from these and other books are contained in Harry Singer and Robert B. Ruddell's anthology, *Theoretical Models and Processes of Reading*, 2nd ed. (Newark, Del.: International Reading Association, 1976).

2. I offer no explanation for the oft-bemoaned sorry state of secondary and college students' reading ability, except to say that its existence is documented, and that I strongly suspect that student (and parental) pressure for fewer and easier reading assignments, the time absorbed by television, and the declining academic achievements of public school teachers who are themselves frequently poor or unwilling readers have all taken their toll. [See Lance M. Gentile and

Merna McMillan, "Some of Our Students' Teachers Can't Read, Either," *Journal of Reading* 21 (1977): 145-148; Robert S. Zais, "The Decline of Academic Performance in the Classroom and the Reading Scores of Prospective Teachers: Some Observations," *The High School Journal* 62 (1978): 52-57; and "Prospective Teachers' Reading Scores: A Cause for Concern?" *Phi Delta Kappan* 59 (1978): 635.] I recall my own experience with a class of thirty graduating seniors at a major university, all of them soon to be teachers of high school English: well over half of the students admitted in a survey to never reading any books, magazines, or newspapers, except when required to for a class assignment, and none had read more than two books for pleasure that year. Many viewed reading as a "disagreeable task" [See Andrew W. Hughes and Kimber Johnston-Doyle, "What Do Teachers Read? Professional Reading and Professional Development," *Education Canada* 18 (1978): 42-45]. In an effort to reverse the downward trend in reading scores, a number of states now require programs in reading instruction for all secondary school faculty [Walter J. Lamberg, "Required Preparation for Secondary Teachers," *Reading Horizons* 18 (1978): 305-307].

3. Frank Smith, ed., *Psycholinguistics and Reading*, pp. 70-83.

4. Kenneth S. Goodman, "Behind the Eye: What Happens in Reading," in *Reading: Process and Program*, ed. K. S. Goodman and Olive Niles (Urbana, Ill.: NCTE, 1970); Kenneth S. Goodman, "Reading: A Psycholinguistic Guessing Game," *The Journal of the Reading Specialist* 4 (1967): 126-135.

5. F. Smith, *Psycholinguistics and Reading*, p. 76; Frank Smith and Deborah Lott Holmes, "The Independence of Letter, Word, and Meaning Identification in Reading," in *Psycholinguistics and Reading*, pp. 59-60.

6. John P. Helfeldt and Rosemary Lalik, "Reciprocal Student-Teacher Questioning"; Dorothy J. Watson, "The Reader-Thinker's Comprehension-Centered Reading Program"; and Charlotte T. Smith, "Improving Comprehension? That's a Good Question," in *Reading Comprehension at Four Linguistic Levels*, ed. Clifford Pennoch (Newark, Del.: International Reading Association, 1979); Phyllis Weaver and Fredi Shonkoff, "Question-Asking Strategies," in *Research within Reach: A Research-Guided Response to Concerns of Reading Educators* (St. Louis and Washington, D.C.: Research and Development Interpretation Service, CEMREL, and the National Institute of Education, 1978), pp. 93-98.

7. See, for instance, Gail B. West, "Estimating Readability," in *Teaching Reading Skills in the Content Areas* (Oviedo, Fla.: Sandpiper Press, 1974), pp. 26-33.

8. Laura A. Smith, "Miscue Research and Readability," in *Findings of Research in Miscue Analysis: Classroom Implications*, ed. P. D. Allen and D. J. Watson (Urbana, Ill.: NCTE, 1976), pp. 146-151; John Dawkins, *Syntax and Readability* (Newark, Del.: International Reading Association, 1975).

9. Benjamin S. Bloom, ed., *Taxonomy of Educational Objectives: Handbook I, Cognitive Domain* (New York: David McKay, 1954); John J. DeBoer and Martha Dallman, *The Teaching of Reading* (New York: Holt, Rinehart and Winston, 1970), p. 174; Lucille B. Strain, *Accountability in Reading Instruction* (Columbus, Ohio: Charles Merrill, 1976), pp. 203-227.

10. Norma Inabinette and Pam Conlon, "The Implications of Piaget's Theory of Formal Operations in College Reading Programs," in *Proceedings*

of the Eleventh Annual Conference of the Western College Reading Association, ed. Gwyn Enright (San Diego, Calif.: Western College Reading Association, 1978), pp. 58-64.

11. Strain, p. 215.

12. Russell G. Stauffer, "Reading as a Cognitive Process," in *Resources in Reading-Language Instruction*, ed. Robert B. Ruddell, et al. (Englewood Cliffs, N.J.: Prentice-Hall, 1974), p. 316.

13. Robert H. Ennis, "A Concept of Critical Thinking," *Harvard Educational Review* 32 (1962): 84.

14. Stauffer, p. 317.

15. Weaver and Shonkoff, pp. 94-95.

16. Jane M. Morse, "Effect of Reader-Generated Questions on Learning from Prose," in *Reflections and Investigations on Reading: Twenty-Fifth Yearbook of the National Reading Conference*, ed. Wallace D. Miller and George H. McNinch (1976), pp. 310-316.

17. Robert B. Ruddell, "Achievement Test Evaluation: Limitations and Values," in *Resources in Reading-Language Instruction*, ed. Ruddell, et al., pp. 383-386; Roger Farr, *Reading: What Can Be Measured?* (Newark, Del.: International Reading Association, 1969); Robert Schreiner, *Reading Tests: A Practical Guide* (Newark, Del.: International Reading Association, 1979); Kenneth S. Goodman, "Testing in Reading: A General Critique" (Position paper for NCTE Reading Commission, 1971).

18. Farr, pp. 33-38.

19. *Linguistic Science and the Teaching of Reading* (Cambridge, Mass.: Harvard University Press, 1956).

20. Goodman, "Testing in Reading."

21. The best of these inventories, the Goodman Taxonomy of Reading Miscues [Kenneth S. Goodman and Carolyn L. Burke, *Theoretically Based Studies of Patterns of Miscues in Oral Reading Performance*, USOE Project No. 90375, Grant No. OEG-0-9-320375-4269 (Washington, DC: Department of Health, Education and Welfare, 1973)], has two major disadvantages which preclude widespread use: (1) the instructor needs several hours to prepare and analyze the test results, even when using computer assistance, and (2) preparation and evaluation of the test results require skill and experience on the part of the tester. The Reading Miscue Inventory, an abbreviated version of the Goodman Taxonomy, still requires more time and effort than the average instructor is able to invest [Joyce Hood, "Is Miscue Analysis Practical for Teachers?" *The Reading Teacher* 32 (1978): 260-266].

22. Marjorie Seddon Johnson and Roy A. Kress, "Procedures for Individual Inventory," in *Informal Reading Inventories*, ed. M. S. Johnson and R. A. Kress (Newark, Del.: International Reading Association, 1965); Phyllis Weaver and Fredi Shonkoff, "Cloze Tasks and Improved Reading Comprehension," in *Research within Reach*; D. Beil, "The Emperor's New Cloze," *Journal of Reading* 20 (1977): 601-604; E. Jongsma, *The Cloze Procedure as a Teaching Technique* (Newark, Del.: International Reading Association, 1971); D. K. Kennedy and P. Weener, "Visual and Auditory Training and the Cloze Procedure to Improve Reading and Listening Comprehension," *Reading Research Quarterly* 8 (1972-73): 524-541; Michael C. McKenna and Richard D. Robinson, *An Introduction to the Cloze Procedure: An Annotated Bibliography* (Newark, Del.: International Reading Association, 1980).

23. Usually, the passage is one the students have not seen before, but occasionally, when an instructor gives a cloze based on a passage with a very high concentration of mathematical information, the dense, concise nature of mathematical writing makes it necessary to allow the student to read the entire passage before completing the cloze.

24. Answers to the Cloze Procedure: 1. to; 2. of; 3. comprehension; 4. not; 5. a; 6. single; 7. new; 8. figured; 9. clues; 10. prepared; 11. using; 12. clues; 13. reader; 14. word; 15. and; 16. unknown; 17. set; 18. her; 19. sleek; 20. hair; 21. the; 22. to; 23. that; 24. wait; 25. the; 26. than; 27. as; 28. rapunzel; 29. have; 30. it; 31. eat; 32. her; 33. into; 34. gather; 35. some; 36. fruit; 37, picked; 38. make; 39. every; 40, like; 41. we; 42. look; 43. rapunzel; 44. would; 45. a; 46. but; 47. of; 48. out; 49. would; 50. dictionary

25. Farr, pp. 44-49; J. B. Stroud, "A Critical Note on Reading: Rate and Comprehension," *Psychological Bulletin* 39 (1942): 173-178.