

text. Vocabulary instruction also plays a central role in vocabulary growth in school-age children. However, across the life span, most researchers would agree that the bulk of vocabulary growth occurs incidentally through exposure to oral language and to written language" (p. 45). What is needed is a clear understanding of how exposure to spoken and written language influences vocabulary growth. Joshi (2005) notes a self-perpetuating cycle in which poor readers learn fewer new words from reading than do good readers because they are exposed to easier materials. This situation in which the rich get richer and poor get poorer is called the Mathews effect, and has serious implications for ensuring that all children learn to read. As reported in the National Reading Panels (2000) review, "there is great need for the conduct of research . . . in authentic school contexts" (p. 4).



Chapter Summary

A great deal of cognitive processing occurs during the quarter of a second that a reader's eye looks at a word on the printed page. This chapter explored four related processes: recognizing phonemes, decoding words, decoding words fluently, and accessing word meaning. Research on reading is notable for several reasons. First, it represents an old area in psychology that is currently experiencing a welcome revival. Second, an extremely large and rapidly growing body of literature addresses reading. Third, there are many different approaches to the study of reading, ranging from pronunciation tasks to eye movement tasks, and many different theoretical approaches.

Basic research on phonological awareness shows that students need to be able to segment a spoken word into its sound units. Phonological awareness appears to be a readiness skill for reading, so some students who have not acquired it by the primary grades may benefit from direct instruction in how to recognize phonemes.

Some of the basic findings concerning decoding have implications for the decision about whether to use a whole-word or phonics approach in reading instruction. Skilled readers possess and use pronunciation strategies for combining letters or letter groups into words. The research suggests that skilled readers have automated the processes involved in word decoding, including the use of word context to identify letter sounds and of pronunciation strategies to combine letters. The current consensus of reading researchers is that the best way to help children acquire efficient decoding processes is to rely on the phonics approach.

The next step in learning to read is to develop fluency in decoding. As children's decoding processes become more automatic, they have more attentional capacity to use for comprehending the material. Research shows that there is an automaticity effect in which skilled learners can perform a task without paying attention to what they are doing. Fluency can be taught by giving students practice in oral reading.

Some of the research findings concerning meaning access have implications for vocabulary training. Beginning or younger readers tend to rely on the context of the other words in a sentence to recognize the meaning of a word; in contrast, older or more skilled readers are able to access word meaning directly. In order to help children become more automatic in their use of sentence context and in understanding unusual words, students can benefit from vocabulary training. Other forms of vocabulary training include encouraging children to engage in silent sustained reading regularly and providing an environment where

children hear and produce spoken language. The ultimate goal of such instruction is to help students automate their meaning accessing processes, so that more attention can be devoted to comprehension processes.

In summary, the implications of psychological research on reading are still far from complete; however, based on the current state of our understanding, instruction in reading should (1) ensure that beginning readers possess phonological awareness, (2) emphasize phonics for beginning readers as well as meaning approaches for developing readers, (3) develop automatic word reading skills through practice, and (4) promote the development of the readers' vocabularies.

SUGGESTED READINGS

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3

Learning to Read for Comprehension

Chapter Outline

The Problem of Comprehending a Passage

Using Prior Knowledge

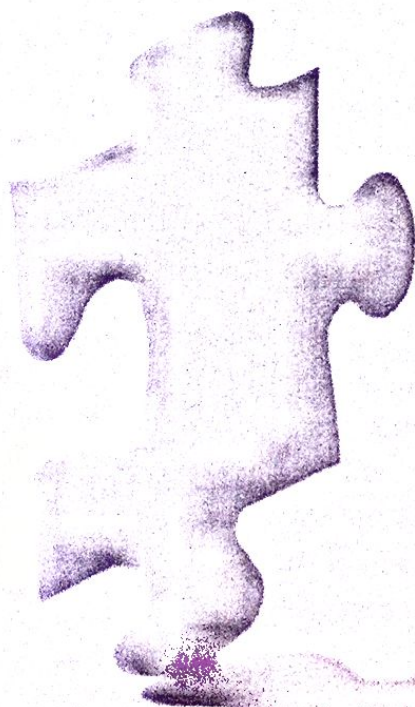
Using Prose Structure

Making Inferences

Using Metacognitive Knowledge

Chapter Summary

This chapter examines techniques for improving students' comprehension of text. Four kinds of cognitive processing needed for effective reading comprehension are using prior knowledge to relate to the new material, using prose structure to determine important information, making inferences during reading, and monitoring whether you comprehend the material. In particular, this chapter investigates the reading comprehension processes of skilled readers and the degree to which these processes can be taught.





The Problem of Comprehending a Passage

Being able to understand a printed passage is an important academic task, and forms the basis for learning in academic subjects. In this section, I describe an example of reading comprehension that can be called *effort after meaning*, offer a theory to help explain the process of reading comprehension that can be called *schema theory*, and identify four cognitive processes that are components in reading comprehension.

WHAT IS EFFORT AFTER MEANING?

Let me ask you to read the passage in Figure 3-1. After you read over the passage once, please put it aside and write down all you can remember.

FIGURE 3-1 Original version of "The War of the Ghosts"

THE WAR OF THE GHOSTS

One night two young men from Egulac went down to the river to hunt seals, and while they were there it became foggy and calm. Then they heard war-cries, and they thought: "Maybe this is a war-party." They escaped to the shore, and hid behind a log. Now canoes came up, and they heard the noise of paddles, and they saw one canoe coming up to them. There were five men in the canoe, and they said:

"What do you think? We wish to take you along. We are going up the river to make war on the people."

One of the young men said: "I have no arrows."

"Arrows are in the canoe," they said.

"I will not go along. I might be killed. My relatives do not know where I have gone. But you," he said, turning to the other, "may go with them."

So one of the young men went, but the other returned home.

And the warriors went on up the river to a town on the other side of Kalama. The people came down to the water, and they began to fight, and many were killed. But presently the young man heard one of the warriors say: "Quick, let us go home, that Indian has been hit." Now he thought, "Oh, they are ghosts." He did not feel sick, but they said he had been shot.

So the canoes went back to Egulac, and the young man went ashore to his house, and made a fire. And he told everybody and said: "Behold I accompanied the ghosts, and we went to fight. Many of our fellows were killed, and many of those who attacked us were killed. They said I was hit, and I did not feel sick."

He told it all, and then he became quiet. When the sun rose he fell down. Something black came out of his mouth. His face became contorted. The people jumped up and cried. He was dead.

Source: From Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge, England: Cambridge University Press. Copyright 1932 by Cambridge University Press. Reprinted with permission of Cambridge University Press.

This passage was used by Bartlett (1932) in his famous research on how people learn and remember meaningful prose. Bartlett asked British college students to read a folk story from a North American Indian culture, so his readers did not have much prior experience with the ideas in the passage. In Bartlett's study, first one person read the passage twice and then 15 minutes later wrote down all he could remember; the version that the first person had written was then read by a second person, who wrote down all he could remember; this version was in turn passed on to the next person; and so on. By the time the story was read and recalled by the last person, it had changed greatly, as shown in Figure 3-2. If you are like the subjects in Bartlett's study, here are some of the changes you made in your recall:

Leveling or flattening: You left out many of the details, such as proper names (e.g.,

Egulac, Kalama). You lost the verbatim writing style of the writer and instead remembered the general points or gist of parts of the story.

Sharpening: You emphasized a few distinctive details, such as the fact that one Indian was not able to go to fight because he had an old mother at home.

Rationalization: You made the passage more compact, more coherent, and more consistent with your expectations. For example, if you viewed the passage as a story about a fishing trip or a naval battle, you would be less likely to remember references to spirits and ghosts.

As you can see, the main point of this demonstration is that people's memories do not work like computers' memories. We do not tend to remember information in verbatim form. We remember some things, but not necessarily in the form they were presented. We often add other elements that were not given as we try to organize our memories in a way that makes sense.

According to Bartlett (1932), when we read a meaningful prose passage we are not passively putting the information into our minds; instead, we are actively trying to understand the passage. Bartlett referred to this active comprehension process as *effort after meaning*. In reading a text, humans must assimilate the new information to existing knowledge—or to what Bartlett called *schemas*. What a person learns from reading a text does not correspond directly to what is presented, but rather to a combination of what is presented and the reader's schema to which it is assimilated. The reader changes the new information to fit his or her existing concepts, and in the process, details are lost and the knowledge becomes more coherent for that person. For "The War of the Ghosts" passage, for example, most readers lacked the appropriate schema concerning a spirit world. Because learning involves assimilating new material to existing concepts, the readers were at a loss. According to Bartlett (1932), "without some general setting or label as we have repeatedly seen, no material can be assimilated or remembered" (p. 172). Because mystical concepts were not a major factor in the readers' culture, these aspects of the story were not well remembered; as a result, the passage was changed into a more common "war story."

Bartlett (1932) also proposed that recalling a story involves an active *process of construction* rather than straightforward retrieval. During recall, we use a general schema—such as a war story—to help generate details that fit with it. Memory is not detailed but rather is schematic, that is, based on general impressions. Although recall produces specific details that seem to be correct, many are, in fact, wrong.

Bartlett's work, although done more than 70 years ago, is concerned with many of the same issues raised by modern cognitive psychologists. Of particular interest is Bartlett's

FIGURE 3-2 Other modern memories from "The War of the Ghosts"

VERSION REPRODUCED BY THE FIRST SUBJECT

THE WAR OF THE GHOSTS

There were two young Indians who lived in Eggiac, and they were driven to the sea to hunt for seals. And where they were hunting it was very high, and very close, in a little white boat which was very small. Then they heard the sound of a war, and they came out of the water and went to look behind a hill. Then they heard the sound of a war, and they saw five canoes. One canoe came toward them, and there were five men in it. They went to the two Indians, and said, "Come with us at this river, and make war on the people there."

But one of the Indians replied, "We have no arrows."

"They are arrows in the canoe."

"But I might be killed, and my people have need of me. You have no parents," he said to the other.

"You can go with them if you wish, so I shall say none."

So one of the Indians went, but the other stayed behind and went home. And the canoe came up the river to the other side of Kalamia, and fought the people there. Many of the people were killed, and many of those from the canoes also.

Then one of the warriors called to the young Indian and said, "Go back to the canoe, for you are wounded by an arrow." But the Indian wondered, for he felt not sick.

And when many had fallen on either side they went back to the canoe, and down the river again, and so the young Indian came back to Eggiac.

Then he told them how there had been a battle, and how many fell and how the warriors had called. He was wounded, and yet he felt not sick. So he told them all the tale, and he became weak. It was not long before he broke when he became weak, and when the sun rose he felt power. And he gave a cry and at the same time his mouth a black thing rushed from it. Then they ran to pick him up, wondering, but when they came he answered not.

He was dead.

VERSION REPRODUCED BY THE TENTH SUBJECT

THE WAR OF THE GHOSTS

Two Indians were out fishing for seals in the Bay of Minnapagan, when along came five other Indians in a war-canoe. They were going fighting.

"Come with us," said the five to the two, "and fight."

"I cannot come," was the answer of the one, "for I have an old mother at home who is dependent upon me." The other said he could not come, because he had no arms. "That is no difficulty," the others replied, "for we have plenty in the canoe with us," so he got into the canoe and went with them.

In a fight soon afterwards this Indian received a mortal wound. Finding that his hour was coming, he cried out that he was about to die. "Nonsense," said one of the others, "you will not die," but he did.

Source: From Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge, England: Cambridge University Press. Copyright 1932 by Cambridge University Press. Reprinted with permission of Cambridge University Press.

view of the reader as actively engaged in an "effort after meaning," that is, an effort to make sense out of the text by relating it to his or her existing knowledge.

WHAT IS A SCHEMA?

Bartlett was one of the first psychologists to address the question of how people learn from meaningful prose. Bartlett's main theoretical concept was the schema—a person's existing knowledge that is used both to assimilate new information and to generate recall of information. For example, in reading "The War of the Ghosts," you must construct an appropriate schema (such as a war story), assimilate facts from the passage to the schema (such as being mortally wounded), and then use the schema to construct a recalled version that includes inferences consistent with the theme.

What is a schema? In a sense, answering this question is a major goal of modern cognitive psychology. Although each theorist offers a slightly different interpretation of what a schema is, a general definition would contain the following points (Mayer, 1992a):

General: A schema may be used in a wide variety of situations as a framework for understanding incoming information.

Knowledge: A schema exists in memory as something that a person knows.

Structure: A schema is organized around a theme.

Comprehension: A schema contains "slots" that are filled by specific information in the text.

Thus a schema is a reader's general knowledge structure that serves to select and organize incoming information into an integrated, meaningful framework.

Several authors have proposed story grammars that readers might use to understand narrative prose, that is, text that tells a story (Mandler & Johnson, 1977; Rumelhart, 1975; Thorndyke, 1977). For example, Mandler and Johnson (1977) suggested that most folk stories can be divided into two main parts: *story* = *setting* + *episode(s)*. An episode in turn can be split into two parts: *episode* = *beginning* + *development*. The development of an episode contains two parts: *development* = *response* + *ending*. A response can consist of two simple parts: *response* = *simple reaction* + *action*, or it can be more complex: *response* = *complex reaction* + *goal path*. A goal path is composed of two parts: *goal path* = *attempt* + *outcome*. Figure 3-3 shows how "The War of the Ghosts" can be broken into a setting and five episodes according to Mandler and Johnson's story grammar. Episode 2, which is followed by Episode 5, follows Episode 1; Episodes 3 and 4 are subepisodes connected to Episode 2. Within each episode, a beginning event is usually followed by some reaction that results in an outcome or ending.

When a reader is given a story to read or listen to, the reader will have expectations that the story will have a structure, such as is indicated in Mandler and Johnson's story grammar. For example, readers expect episodes in which some beginning event is followed by attempts to respond to it that result in an ending. Graesser (1981), Gernsbacher (1990), and others point out that younger readers often lack appropriate schemas to understand prose. For example, Whaley (1981) found that third graders are far less able than sixth graders to predict what will come next in a story. Presumably, younger readers are not as aware of story grammars as are older readers. Thus learning to read involves learning to fill in each general part of the structure (such as the beginning, action, and ending of each episode) with specifics from the story.

FIGURE 3-1 Analysis of First Part of the Passage Using Story Grammar

Setting	1	I had eight men going down from Kigoma upon drums to the river to make war.
	2	and while they were there a hurricane broke and came.
Episode 1		
Beginning	3	I had three hundred men with me.
	4	and they thought, "What is there in a war-party?"
Complication	5	They came upon the alluvial.
	6	and had to find a way.
Attempt	7	Some of them came up.
	8	and they heard the noise of paddles.
Ending	9	and then we all came coming up to them.
Episode 2		
Setting	10	There were five men in the canoe.
Beginning	11	and they said, "What do you think? We wish to take you along."
	12	We are going up the river to make war on the people."
Attempt	13	One of the young men said, "I have no arrows."
	14	"Arrows are in the canoe," they said.
Outcome	15	"I will not go along."
	16	I might be killed.
Attempt	17	My relatives do not know where I have gone.
	18	But you," he said, turning to the other, "may go with them."
Outcome	19	So one of the young men went.
	20	but the other returned home.
Ending	21	And the warriors went on up the river to a town on the other side of Kalamu.
		(continued)

FIGURE 3-2 Summary

Beginning	
Complication	
Attempt	
Ending	
Beginning	
Attempt	
Ending	
Beginning	
Attempt	
Ending	

WHAT SKILLS ARE NEEDED FOR READING COMPREHENSION?

This chapter is concerned with the process of reading comprehension and in particular with understanding the skills that underlie a reader's "effort after meaning." What are the skills? In a review of five major basal reading series, Rosenshine (1980) found that emphasized the following eight skills: (1) locating details, (2) identifying the main idea, (3) recognizing the sequence of events, (4) developing conclusions, (5) recognizing cause and-effect relationships, (6) understanding words in context, (7) making inferences, and (8) drawing inferences from the text. However, Rosenshine found no evidence that

FIGURE 3-3 (continued)

Episode 3		
Beginning	22	The people came down to the water,
	23	and they began to fight,
	24	and many were killed
	25	But presently the young man heard one of the warriors say: "Quick, let us go home; that Indian has been hit."
Simple reaction	26	Now he thought: "Oh, they are ghosts."
	27	He did not feel sick,
Action	28	but they said he had been shot.
Ending	29	So the canoes went back to Egulac,
Episode 4		
Beginning	30	and the young man went ashore to his house, and made a fire.
	31	And he told everybody and said: "Behold I accompanied the ghosts, and we went to fight.
	32	Many of our fellows were killed,
Action	33	and many of those who attacked us were killed.
	34	They said I was hit,
	35	and I did not feel sick."
	36	He told it all,
Ending	37	and then he became quiet.
Episode 5		
Beginning	38	When the sun rose he fell down.
	39	Something black came out of his mouth.
	40	His face became contorted.
Action	41	The people jumped up and cried.
Ending	42	He was dead.

From Mandler and Johnson (1977).

basal series taught these skills in the same order and sequence. Similarly, Pearson and Fielding (1991) noted that reading comprehension instruction often teaches students how to activate background knowledge, to use text structure, or to summarize text. Based on an analysis of performance on a variety of reading comprehension tests, Hannon and Daneman (2001) proposed four main component processes in reading comprehension: accessing relevant knowledge from long-term memory, integrating accessed knowledge with information from the text, making inferences based on information in the text, and recalling newly learned text material. Brown and Palincsar (1989; Palincsar & Brown, 1984) identified four major reading comprehension skills: (1) generating questions that