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Moving From the Old to the New: Research on Reading Comprehension Instruction

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This article is an attempt to integrate findings from research about comprehension processes, comprehension strategies, and teaching strategies in order to inform instructional practice in reading comprehension. The article begins with a discussion of traditional views about reading and how those views have shaped the current comprehension curriculum in American schools. A view of comprehension based on recent models of the reading process is presented next as a basis for reconceptualizing the comprehension curriculum as a set of five effective comprehension strategies. From research on teaching comes a foundation for establishing a new view of instruction, one that focuses on the negotiation of meaning among students and teachers through teachers' instructional actions. Instructional recommendations, based on the research synthesized in this article, and questions for future research bring the article to a close.

In the last 20 years, educators have made significant advances in their thinking about how students learn and what it is that teachers ought to teach. In the field of reading, for instance, recent research from two distantly related enterprises, cognitive science and research on teaching, has encouraged reading educators to rethink prevailing constructs about reading comprehension and how they affect teaching and learning.

In this article, we review and synthesize the research on comprehension and its teaching. We explore new concepts of reading comprehension based on a considerable body of research accumulated over the last 20 years. To do this, we trace the history of the current comprehension skills curriculum from its behavioral origins in the early part of this century and then show how those conflict with current cognitive views of the reading process. From this cognitive view, we ask two questions: What should be taught in the name of comprehension, and how should instruction be delivered? To answer the first question, we propose an alternative reading curriculum drawn primarily from a body of research on strategy learning and use. To answer the second question, we first consider the foundational work conducted in the process-product tradition and then contrast it with more recent work on teacher reflection and decision making. This newer research forms the basis for rethinking the nature of comprehension instruction. We close with a set of instructional recommendations based on this review and a set of unresolved questions and issues in comprehension instruction.

Historical Origins of the Current Comprehension Curriculum

Educational practice is, and always has been, heavily influenced by psychology. Numerous scholars have pointed to the strong relationship between psychological thought in different historical periods and prevailing instructional practice (see Clifford, 1978; Glasser, 1982). For example, Resnick (1985) traced much of current educational practice back to early educational psychologists' notions about learning. Beginning with Thorndike in the 1920s and 1930s, psychologists linked learning to a series of now classic *associations* or *S-R bonds*. This thinking led to and was encouraged by psychological research on human skill and performance, and psychologists began to conduct task analyses of the subskills that made up these skills and performances (Gagne, 1977; Glasser, 1982; Resnick, 1985). In the 1950s, with the rise of B. F. Skinner's influence (1957), instructional psychology (see Resnick, 1985) took a decidedly more behavioral and task-analytic bent with the introduction of programmed instruction, mastery learning (Bloom, 1968), and behavior modification. Remnants of these instructional programs and methods can be seen today in nearly every subject area and in nearly every school.

It is important to understand that the reading comprehension curriculum that exists in American schools today was built from the strong behavioral and task-analytic notions about learning that prevailed throughout the early and middle parts of this century. Smith (1965) documents how reading was viewed as a skill that could be decomposed into a component set of subskills involved in both decoding and comprehension. Examples of comprehension subskills included sequencing events in a story, predicting outcomes of a story, drawing conclusions, finding the main idea, and so forth. Further, it was believed that reading could be improved by teaching students each of these necessary subskills to a minimal level of mastery (Rosenshine, 1980).

The proliferation of comprehension skills and the comprehension curriculum as we know it today emerged from this task-analytic behavioral conception of reading. Guthrie (1973) described this curriculum as an assembly-line model of skill acquisition. In such a curriculum, it is assumed that each skill can be mastered and that the aggregate of all the subskills equaled reading comprehension.

There were doubting Thomases, even in the 1950s. Some questioned the movement to a discrete comprehension skills curriculum based on behavioristic analyses of the reading process. For instance, Sochor (1959) argued:

> Much of the variability in what constitutes . . . reading is due to insufficient research evidence on the reading abilities themselves and on basic and related factors which might contribute. Research workers have been unable to clarify sufficiently the nature, independence or difficulty levels of comprehension abilities in reading. Consequently, those concerned with reading abilities resort to logic for a definition of . . . reading. (pp. 47–48)

Over the last 20 years, basic and applied research in reading has provided some answers to the problems identified by Sochor (1959). This research has resulted in a new understanding of the reading process and a different view of what is important to teach.

A Cognitively Based View of Reading Comprehension

Reading is a far more complex process than had been envisioned by early reading researchers; above all, it is not a set of skills to be mastered (Anderson, Hiebert, Scott, & Wilkinson, 1984). In the traditional view, novice readers acquire a set of

hierarchically ordered subskills that sequentially build toward comprehension ability. Once the skills have been mastered, readers are viewed as experts who comprehend what they read. In this view, readers are passive recipients of information in the text. Meaning resides in the text itself, and the goal of the reader is to reproduce that meaning.

Cognitively based views of reading comprehension emphasize the interactive nature of reading (Rumelhart & Ortony, 1977) and the constructive nature of comprehension (Anderson, Reynolds, Shallert, & Goetz, 1977; Rumelhart, 1980; Spiro, 1980). All readers, both novices and experts, use their existing knowledge and a range of cues from the text and the situational context in which the reading occurs to build, or construct, a model of meaning from the text. According to this view, even novice readers can behave like experts when presented with texts and tasks for which they possess appropriate knowledge. Conversely, even expert readers can be reduced to novices when presented with obscure or ambiguous texts. Thus, two important characteristics of readers—the knowledge that students bring to the task and the strategies that they use to foster and maintain understanding—play important roles in distinguishing the old and new views of comprehension.

The knowledge that readers bring to the text is paramount (Anderson, Reynolds, Shallert, & Goetz, 1977; Rumelhart & Ortony, 1977; Spiro, 1980). What we typically call *prior knowledge*[1] comes in many forms: (a) specific knowledge about the topic of the text; (b) general world knowledge about social relationships and causal structures; and (c) knowledge about the organization of the text (Resnick, 1984). Add to that the levels of knowledge that students need about strategies (see, e.g., Paris, Lipson, & Wixson, 1983) and the concept of prior knowledge becomes quite complex. In particular, Paris, Lipson, and Wixson (1983) implicate *declarative* (What is the nature of this strategy?), *procedural* (How do I deploy it?), and *conditional* (When and why would I ever use it?) knowledge as well.

Across all levels of age and ability, readers use their existing knowledge as a filter to interpret and construct meaning of a given text (Anderson & Pearson, 1984). They use this knowledge to determine importance (Afflerbach, 1986), to draw inference (Gordon & Pearson, 1983; Hansen, 1981; Hansen & Pearson, 1983), to elaborate text (Hansen & Pearson, 1983), and to monitor comprehension (Dewitz, Carr, & Patberg, 1987).

But, although students' existing knowledge is crucial to comprehension, the relationship between that knowledge and text comprehension is not a simple, orthogonal one. Sometimes the knowledge is inert and therefore not brought to bear in the comprehension process (Bransford & Johnson, 1972). Other times the knowledge is incomplete, fragmented, naive, or even misleading (Lipson, 1982). And, when students possess knowledge that conflicts with the information encountered in text, students' existing knowledge can and often does prevail over textual information (Alvermann, Smith, & Readence, 1985; Anderson & Smith, 1987; Dole & Smith, 1987, 1989; Eaton, Anderson, & Smith, 1984; Lipson, 1982, 1983; Marie & MacGinitie, 1982; Roth, 1985). Anderson (1977) noted that students are not likely to change their existing knowledge unless they recognize and are dissatisfied with the fact that it no longer provides an adequate account of their everyday experiences. Thus, for better and for worse, knowledge plays a critical role in cognitively based views of reading.

In addition to knowledge, expert readers possess a set of flexible, adaptable strategies that they use to make sense of text and to monitor their ongoing under-

standing. They also possess, as we have suggested, a set of concepts about those strategies. A cognitive view of comprehension ascribes more credibility to reading strategies than to skills (see, e.g., Duffy, Roehler, Sivan et al., 1987; Pressley, Goodchild, Fleet, Zajchowski, & Evans, 1989). *Strategies* are thought of as conscious, instantiated, and flexible plans readers apply and adapt to a variety of texts and tasks (Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989). *Skills,* by contrast, are viewed as highly routinized, almost automatic behaviors. Researchers have identified a number of effective strategies that good readers use to comprehend text (Pressley, Goodchild, et al., 1989; Pressley, Johnson, et al., 1989).

There are several important distinctions between traditional skills and what we have come to call strategies, at least as they are conceptualized in recent work. First, there is a distinction in intentionality. Strategies emphasize intentional and deliberate plans under the control of the reader. Good readers make decisions about which strategy to use, when to use it, and how to adapt it to a particular text (Pressley, Goodchild, et al., 1989). Skills are more or less automatic routines. Second, there is a distinction in cognitive sophistication. Strategies emphasize reasoning; readers use reasoning and critical thinking abilities as they construct and reconstruct evolving meanings from the text. Skills, on the other hand, tend to be associated with lower levels of thinking and learning. Third, there is a difference in flexibility. Strategies are inherently flexible and adaptable. Readers modify strategies to fit different kinds of texts and different purposes. By contrast, skills, at least in reading pedagogy, connote consistency, if not rigidity, in application across a variety of texts. Fourth, there is a difference in awareness. Strategies imply metacognitive awareness; good readers can reflect on what they are doing while they are reading (Baker & Brown, 1984). They are aware of whether they understand or do not understand, and this awareness usually leads to regulation and repair. On the other hand, in the traditional skills curriculum, it is assumed that with repeated practice and drill readers would automatically apply the skills they learn to whatever they read. There is no place for the intentional or conscious use of these skills; it is simply assumed that they will be used automatically or unconsciously.

The cognitive views of reading present a different view of the reader. The traditional view assumes a passive reader who has mastered a large number of subskills and automatically and routinely applies them to all texts. The cognitive view assumes an active reader who constructs meaning through the integration of existing and new knowledge and the flexible use of strategies to foster, monitor, regulate, and maintain comprehension. The only thing that becomes automated in the newer view is the disposition to adapt strategies to the particular constraints in the act of comprehending a particular text.

Given this new view of the reading process as the active construction of a model of text, we are now ready to ask two pedagogical questions: What should be taught in the name of comprehension, and how should the instruction be delivered?

Components of a Comprehension Curriculum: What Should Be Taught?

Comprehension instruction based on a cognitive view of the reading process would emphasize teaching a set of strategies that students can use to comprehend text. The goal of instruction would be to develop a sense of conscious control, or metacognitive awareness, over a set of strategies that they can adapt to any text they read (Pressley, Johnson, et al., 1989).

Strategies that might comprise a revised comprehension curriculum can be identified from cognitively focused reading research. In this section, five such strategies are identified from the research evidence. Similar to Pressley, Goodchild, et al. (1989), we have identified a small set of strategies rather than a large set of skills. At a general level, three criteria were used to identify the strategies: (a) consistency with a cognitively based view of the reading process; (b) differentiation between skilled readers and novices; and (c) instructional amenability.

Strategy 1: Determining Importance

Determining importance has attracted considerable attention and research interest (Baumann, 1986; Cunningham & Moore, 1986; Williams, 1986b), most often under the rubric of main idea. Williams (1986a) and Winograd and Bridge (1986) pointed out that the terminology for this curricular component differs considerably from one researcher to another and from one instructional program to another, including terms such as *gist, topic, topic sentence, macrostructure, superstructure, key word, thesis, theme,* and *interpretation*. Regardless of the terminology used, the activity seems to need and get considerable instructional time (Baumann, 1984).

Often, skilled readers adapt their purpose for reading to differentiate important from nonimportant information. Several investigators (Williams, 1986a; Tierney & Cunningham, 1984; Winograd & Bridge, 1986) make a distinction between *author-determined importance* and *reader-determined importance*. Reader-determined importance is best demonstrated in a classic study by Pichert and Anderson (1977). When readers read an ambiguous passage from the perspective of a home buyer, they rated as most important text segments dealing with space, repair problems, and the like. Readers who read the same passage from the perspective of a burglar found other parts, mainly dealing with entry and the value of goods, to be important.

However, most, if not all, school-based reading requires readers to determine author-based (which is usually thought to be identical to text-based) importance rather than reader-based importance. Good reader/poor reader studies have consistently found that good readers are better able to judge author-based importance than are poor readers (Afflerbach, 1986; Englert & Hiebert, 1984; Johnston & Afflerbach, 1985; Winograd, 1984). Winograd and Bridge (1986) and Afflerbach (1986) found that good readers accomplish this task in three ways. First, good readers use their general world knowledge and domain-specific knowledge to allow access to and evaluation of the content of the text. Second, good readers use their knowledge of author biases, intentions, and goals to help determine importance. Third, good readers use their knowledge of text structure to help them identify and organize information.

Meyer and Rice (1984) define text structure as " . . . how the ideas in a text are interrelated to convey a message to a reader" (p. 319). Knowledge about the structure of a text includes story grammar knowledge for narrative texts (Mandler & Johnson, 1977; Stein & Glenn, 1979) as well as knowledge of the organization of the overall or top-level structure of a text. Knowledge about the structure of a text has been found to be particularly important for helping readers differentiate important from unimportant information as well as for organizing and recalling information (see Meyer & Rice, 1984; Slater & Graves, 1989, for complete reviews). Readers who can identify and use the top-level structure of a text appear to recall more than readers who cannot (Meyer, 1975; Meyer & Rice, 1984; Voss, Tyler, & Bisanz, 1982).

Further, good readers appear to use text structure to facilitate the recall of the main ideas in the text as well as total comprehension and recall.

Although students have traditionally not been given direct advice about how to differentiate important from unimportant information (Williams, 1986a), studies suggest that this strategy can be improved through instruction. For example, Baumann (1984) compared a skills-based approach to main idea instruction with a researcher-devised direct instruction approach. Students who received direct instruction on determining main ideas improved their comprehension to a greater degree than did students who received the typical skills approach. Similarly, Williams, Taylor, Jarin, & Milligan (1983) found that their instructional program improved learning disabled students' performances on main idea comprehension tests; Wade and Trathen (1989) found that prereading questions improved poor readers' recall of important information.

In summary, the ability to separate the important from the unimportant leads to effective comprehension, and the ability to accomplish this task seems readily amenable to instruction. Consequently, this strategy becomes a strong candidate for inclusion in our cognitively based comprehension curriculum.

Strategy 2: Summarizing Information

Often confused with determining importance, summarizing is a broader, more synthetic activity for which determining importance is a necessary, but not sufficient, condition. The ability to summarize information requires readers to sift through large units of text, differentiate important from unimportant ideas, and then synthesize those ideas and create a new coherent text that stands for, by substantive criteria, the original. This sounds difficult, and the research demonstrates that, in fact, it is.

Summarization appears to be developmental in nature. For example, children of all ages can synthesize the plot structure of simple narratives (such as folk tales), but young children have much greater difficulty with more complex tasks on the same stories, such as relating the importance of each section to one of the story's themes (Brown & Smiley, 1977; Brown, Smiley, & Lawton, 1978). With maturity, children become more adept at the more complex tasks (Brown & Smiley, 1977; Pichert, 1979), apparently because they become more aware of how texts are organized and how to focus their study time on information they had not previously learned (Brown & Campione, 1979).

Just as researchers have differentiated between reader-based and text-based importance, so too have some researchers differentiated between writer-based and reader-based summaries (Hidi & Anderson, 1986). Writer-based summaries are often written to promote comprehension and recall of important information in text. Because writer-based summaries are read only by the writer, they are best written while the material is being read. Further, such summaries do not have to be concerned with the amount of material summarized, the quality or comprehensibility of the summary, or the mechanical aspects of the summary.

However, as with the case of determining importance, most summaries that students produce are reader-based as opposed to writer-based. That is, students are asked to produce a summary of a book, article, or story for a particular audience—for example, the teacher, other students, a newspaper. Therefore, students have to attend to issues such as length, cohesion, grammatical structure, and the like. Just as importantly, students also have to try to pull out the most important information and

condense it into an accurate and comprehensible text that represents the larger, original text (Hidi & Anderson, 1986). In essence, a reader-based perspective changes summarization from a comprehension to a composition task.

Whereas researchers have used different terms to identify the different operational procedures used to summarize, three operations appear repeatedly across studies (Hidi & Anderson, 1986). Some information must be selected, while other information is deleted. Some material must be condensed, while higher superordinate concepts are substituted. Finally, material must be *integrated* into a coherent and accurate representation of the original material.

Summarization appears to be a strategy that is amenable to instruction. Day (1980) was able to teach both regular and remedial community college students to improve the quality of their summaries. Subsequent studies by Hare and Borchardt (1984) and Taylor and her colleagues (Taylor, 1982; Taylor & Beach, 1984; Taylor & Berkowitz, 1980) support summary training programs for intermediate and high school students. Palincsar and Brown (1984) used summarization procedures as a part of their *multicomponent, metacognitive training package* (Palincsar, 1985); this package, and the summary training that was included in it, has been demonstrated to be an effective technique for improving comprehension.

Strategy 3: Drawing Inferences

One of the most common findings of recent reading research is that drawing inferences is an essential part of the comprehension process, even among young children (Anderson & Pearson, 1984). Inference is the heart of the comprehension process. As they construct their own models of meaning for a given text, readers and listeners alike use inferencing extensively to fill in details omitted in text and to elaborate what they read (Anderson, 1977; Anderson, Spiro, & Anderson, 1978; Bransford, Barclay, & Franks, 1972; Brown, Smiley, Day, Townsend, & Lawton, 1977; Kail, Chi, Ingram, & Danner, 1977). A classic illustration of this *slot filling* function can be found in the Kail et al. (1977) study in which second and sixth graders read sentences such as: *Mary was playing in a game. She was hit by a bat.* Although the game of baseball was never mentioned in these sentences, students had no difficulty drawing the inference that Mary was playing baseball. Even second graders used their prior knowledge to infer that if Mary was hit by a bat in a game, she must have been playing baseball. Whereas studies like this one demonstrate that children can draw inferences, children do not always do so automatically (see, e.g., Paris & Lindauer, 1976). The important point is that even the simplest of texts requires inferencing.

Children as young as second grade can be taught to improve their inferencing abilities. For instance, Hansen (1981) and Hansen and Pearson (1983) helped students learn to draw inferences by giving them visual and kinesthetic reminders of how to integrate prior knowledge and text knowledge. Similarly, in studies by Raphael and her colleagues (Raphael & McKinney, 1983; Raphael & Pearson, 1985; Raphael & Wonnacott, 1985), experimenters asked young students to identify and label strategies used to answer comprehension questions, especially inference questions, by helping students decide whether a question must be answered with their prior knowledge alone or with a combination of prior knowledge and text information. The result was improved comprehension of text, especially students' answering of inferential questions.

Despite persistent, well-meaning positions that argue for delaying inferential activities until literal comprehension is mastered (e.g., you need to get the facts straight before you can reason beyond the text), both basic and applied reading research supports a strong emphasis on inferential strategies from the beginning of instruction.

Strategy 4: Generating Questions

Teacher-generated questions are a time-honored instructional practice in reading. In contrast, student-generated questions are rarely used, even though they have been shown (Andre & Anderson, 1978–1979) to lead to deeper levels of text processing (Craik & Lockhart, 1972).

Instruction to promote student-generated questions leads to improved text comprehension (Brown & Palincsar, 1985; Brown, Palincsar, & Armbruster, 1984; Singer & Donlan, 1982). In the Singer and Donlan (1982) study, high school students were taught to generate story-specific questions from a set of general questions developed from story grammars. Thus, students used a list of general story grammar questions (e.g., Who are the main characters in the story? What does the leading character initiate?) to create their own more specific questions about the particular story they were reading. Students who generated their own questions improved their comprehension of stories more than students who simply answered questions constructed by their teachers. Singer and Donlan concluded that the student-generated questions led to an active comprehension of stories which, in turn, led to improved understanding of text.

The Brown and Palincsar (1985) studies provide additional evidence for the utility of student-generated questions. They taught junior high students to generate questions as one part of four strategies taught together. Again, there is no way to identify the independent contribution of the student-generated question strategy, but it was an integral part of an omnibus procedure that led to impressive improvements in comprehension.

Whereas these studies demonstrate the usefulness of student-generated questions, other studies have led to more ambiguous results (see Tierney & Cunningham, 1984; Pearson & Fielding, 1991, for reviews). The key to the effectiveness of student-generated questions may lie in the instruction itself. In the Singer and Donlan study and the Palincsar and Brown studies, students were trained carefully and given a structure in which to work. Further, in the study by Andre and Anderson (1978–1979), students who received structured training in how to generate questions outperformed students who were asked to generate questions and students who merely reread the text; those students who were asked to generate questions performed no better than students who reread the material. Hence, the nature and intensity of the instruction may be critically important (see also, Pressley, Johnson, et al., 1989).

Strategy 5: Monitoring Comprehension

Comprehension monitoring is another strategy that has received considerable research attention. Good readers are better than poor readers, not only at reading but also at monitoring, controlling, and adapting their strategic processes while reading. Poor readers, by contrast, are much less aware of problems that exist and less able to solve problems even when they are aware of them (Baker & Brown, 1984;

Garner, 1987; Wagoner, 1983). Hence comprehension monitoring is a two-part process—being aware of the quality and degree of one's understanding and knowing what to do and how to do it when one discovers comprehension failures.

Comprehension monitoring. To study comprehension monitoring, the experimental tool of choice of researchers is an error detection task; subjects read a text that contains anomalies; monitoring is measured in terms of either their abilities or speed in detecting anomalies. The anomalous information can be inconsistent either with world knowledge or text information. Furthermore, the anomalous information can come from common domains of knowledge (e.g., gravity or plant growth) or obscure domains (e.g., the effect of heat on metal magnetism or the habits of light-emitting animals). The typical task requires subjects to recognize and report inconsistencies while they are reading or listening.

Students seem to develop a nonverbal awareness of anomalies before they are able to report them verbally, as evidenced by the fact that, even where students could not verbally identify certain anomalies, they spent more time reading the sections of the text containing them than they did on sections without anomalies (Flavell, Speer, Green, & August, 1981; Harris, Kruithof, Terwogt, & Visser, 1981; Patterson, Cosgrove, & O'Brien, 1980). Baker and Anderson (1982) found that students more accurately detected anomalies as parts of main idea statements rather than detail statements. Vosniadou, Pearson, and Rogers (1988) found that mode of presentation, topic familiarity, and textual explicitness had independent influences upon students' abilities to detect inconsistencies. Third grade students could better detect inconsistencies when listening to a story than when reading it. In addition, when the topic was familiar, even first grade children were able to detect inconsistencies in a listening mode. When it was unfamiliar, however, first grade children were unlikely to detect the inconsistencies even when they were contradicted in another part of the text. However, when the anomaly also contradicted a previous statement in the text, older children (third and fifth grade) were able to detect inconsistencies even for unfamiliar topics.

This wealth of information about comprehension monitoring notwithstanding, these studies often lack ecological validity. People seldom encounter the type of intentionally embedded anomalies found in the experimental texts used in research; to the contrary, good writers strive to avoid them. For most readers, text information becomes anomalous in two situations—when they lack the prior knowledge necessary to understand the text or when they become aware that their existing knowledge contradicts the text (as with misconceptions or naive conceptions). In this sense, natural anomaly is really nothing but novelty. Additionally, novice readers (and occasionally expert readers) encounter additional anomalies when they misread words or phrases and become aware of an inconsistency between what they heard themselves say and their emerging model of meaning of the text.

More ecologically valid texts have been used in a few studies of comprehension monitoring. In an attempt to improve students' inferencing and comprehension monitoring abilities, Dewitz, Carr, & Patberg (1987) developed three instructional treatments to be used with everyday passages. In their study, explicit instruction designed to help students fill in key missing words (a sort of instructional cloze procedure) was successful in improving students' comprehension abilities. The previously mentioned Palincsar and Brown (1984) instructional studies engaged students in recognizing and identifying difficult parts of passages taken from commonly used

expository materials. As one component of their four-part process, students engaged in discussions about what parts of the text they found to be difficult. Additionally, when lessons on comprehension monitoring have been included in larger metacognitive training programs (Duffy, Roehler, Sivan, et al., 1987; Paris, Cross, & Lipson, 1984), elementary students have improved their ability to apply these strategies to reading activities. Consequently, despite the developmental nature of monitoring, it appears that students can be taught to improve this important strategy.

Fix-it strategies. Comprehension monitoring also includes knowing what to do when comprehension breaks down. Such restoration of comprehension appears to be critical to expertise in reading. Good readers know what to do when, while monitoring their comprehension, they encounter a problem. In monitoring, they anticipate that problems will arise, and they take action to solve them when they do (see Garner, 1987, for an extensive review).

There are several classic restoration, or fix-it, strategies that appear to distinguish the monitoring-prone expert from the novice reader, who seems not to be disposed to monitor at all. For example, expert readers tend to be more discriminating in their use of time and energy. Given a direction to memorize a set of drawings 50% too large for their memory capacity, Masur, McIntyre, and Flavell (1973) found that older students adopted a much more efficient and adaptive strategy from one trial to the next than did younger students, who tended to use the same approach from one trial to the next. Working on a similar problem of managing resources, Owings, Peterson, Bransford, Morris, and Stein (1980) obtained similar results. When students were given an opportunity to study two stories that they knew were of different difficulties (they had rated their respective difficulties themselves), the better students studied the more difficult story for a significantly longer period of time than the less difficult story; in contrast, the poorer students studied the two stories for approximately equal periods of time.

Moreover, experts are much more likely than novices to use available resources, such as looking back at the text, to resolve a problem. Alessi, Anderson, and Goetz (1979) found that knowledge deficits due to lacking or losing information could be almost completely restored with an induced look-back strategy on the part of college students. Garner and her colleagues (Garner, Macready, & Wagoner, 1984; Garner & Reis, 1981; Garner, Wagoner, & Smith, 1983), who have investigated the look-back phenomenon extensively, also report a consistent positive relationship between using the look-back strategy and better reading comprehension (see Garner, 1987).

Experts are also more flexible than novices; they are much more likely than novices to use different strategies in different circumstances. Work by Raphael and her colleagues (Raphael & Pearson, 1985; Raphael & Wonacutt, 1985) consistently demonstrated that students who could adapt question-answering strategies to text and task demands consistently outperformed students who could not. For example, when students were given a choice between three strategies—answering a question by going right to the part of the text that the question came from, searching around the text to find a response that fit the question, and relying primarily on one's prior knowledge—good readers were better able to adapt appropriate strategies than were poor readers (Raphael et al., 1980). Poor readers, in contrast, tended to use only one approach to answering questions; they often rigidly applied a simple text-matching or answer-grabbing strategy (Pearson & Johnson, 1978).

Comprehension monitoring and fix-it strategies appear to be important for developing expertise in reading comprehension. It is not only that good readers monitor;

it is also that their monitoring appears to be the key to restoring lost comprehension. Thus, monitoring distinguishes the expert from the novice reader.

Summary

In this section, we have tried to demonstrate that cognitively based research suggests a reconceptualization of the reading process and, therefore, a reconceptualization of the comprehension curriculum. Whereas traditional views conceptualized reading as a set of discrete skills to be mastered, cognitively based views suggest a more holistic view of reading. Reading is seen as a process in which knowledge held by the reader interacts with textual information in the construction of meaning. Skilled readers use their stores of existing knowledge as well as a number of flexible strategies to construct a mental model of the text. They monitor their ongoing comprehension and change strategies when comprehension breaks down. They adjust their strategy selection and their metacognitive awareness depending on their level of domain-specific knowledge (Alexander & Judy, 1988).

Exemplary comprehension instruction derived from this new view suggests a curriculum emphasizing readers' existing knowledge and a set of reading strategies that good readers use in a metacognitive, regulatory way. How this new reading curriculum should be facilitated and learned becomes a focus for the second part of this review.

How Should the New Curriculum Be Delivered?

Just as cognitive research points to the need for a new conceptualization of the comprehension curriculum, so research on teaching suggests that we rethink instruction, including comprehension instruction. Traditionally, curriculum designers, instructional theorists, and teachers have relied on a drill-and-practice model of instruction; that is, repeatedly exposing students to tasks such as answering comprehension questions and completing skill exercises until they have achieved mastery (Duffy & McIntyre, 1982; Durkin, 1978–1979). Recent research, however, has led to models of instruction that change the role of teachers and students.

An Historical Perspective

Until about 1970, research on the effects of teacher instruction was rare. Some scholars even believed that teachers did not make much of a difference in students' learning, and there was at least some empirical support for this belief (see, e.g., Coleman, 1979). Several scholarly articles (Dunkin & Biddle, 1974; Rosenshine & Furst, 1973) as well as federal agency funding (e.g., the Office of Education and the National Institute of Education) during the early 1970s spurred researchers to examine teacher effects (see Brophy & Good, 1986, for a discussion). The immediate result was a body of research called *process-product* research.

Process-product research examined the instructional acts (*processes*) of more effective teachers whose students achieved high scores on standardized tests (*products*) and compared them to the instructional acts of less effective teachers. Researchers such as Brophy (1979), Good (1983), Rosenshine (1979), and Rosenshine and Stevens (1984) used findings from this process-product research to identify specific instructional acts associated with these high test scores. Many of these acts or behaviors were then validated in a frequently cited experimental study in reading (Anderson, Evertson, & Brophy, 1979). In this study, first grade teachers who were

taught to use the instructional acts of effective teachers produced significantly better reading achievement test results than teachers who were not taught to use these instructional acts. This study, plus many others (see, Brophy & Good, 1986; Rosenshine & Stevens, 1984, for summaries) are sometimes referred to as *direct instruction* research because the results indicated that effective teachers present curricular goals in direct rather than indirect ways.

However, from the standpoint of examining and evaluating comprehension instruction, process-product research had several weaknesses. First, the criterion for teacher effectiveness was achievement test performance on standardized tests of skill-based tasks that are, at best, marginally consistent with a cognitive view of comprehension. Second, process-product research assumed the validity of a drill-and-practice model of instruction; other ways to teach or foster comprehension were not well studied. Third, process-product research was focused almost exclusively on time-on-task issues. Teacher actions that increased students' time on academic tasks were emphasized, rather than crucial qualitative dimensions of instruction. A fourth weakness was reliance on single measures of comprehension rather than multiple indicators. And, whereas a discussion of comprehension assessment goes well beyond this review, the current literature is replete with alternative measures of assessment including observations, retellings, written products, and portfolios (see, e.g., Pearson & Valencia, 1987).

The time-on-task issue was nevertheless important, and ultimately it proved to be the major contribution of process-product research. When this research had been disseminated to teachers, it frequently took the form of techniques that helped teachers keep students on task. This was not surprising because it supported the prevailing practical observation that teachers require skillful classroom management to get and hold students' attention (Anderson, Evertson, & Emmer, 1980; Doyle, 1979).

This tradition was significant for several reasons. It documented the fact that specific teacher actions result in improved student performances, particularly with traditionally at-risk children. It acknowledged the importance of good classroom management as a central feature of effective instruction. It also helped researchers and educators distinguish between classroom management (i.e., getting students on task and keeping them there) and instruction (i.e., helping students build understandings), thereby paving the way for research on qualitative aspects of instruction that went well beyond getting students on task. Finally, process-product research provided indirect support to teacher education—it demonstrated that effective teacher actions could be identified and learned by other teachers.

A Current View of Instruction

The limitations of process-product research inspired a new phase of research on teaching. This new phase arose from four lines of research that caused educators to rethink and redefine the notion of *instruction*.

The cognitive views of the comprehension process discussed earlier (Anderson, 1977; Anderson & Pearson, 1984) affected research on teaching. From this view, researchers imported the *constructive* metaphor for reading to explain how students learn, quite literally, to read instruction. Just as in text comprehension readers construct a model meaning from prior knowledge about the topic and cues gleaned from the text and situational context, in instructional comprehension students con-

struct a model of meaning of instructional events by using knowledge about instruction and cues gleaned from the teacher and/or other students in the instructional context. Gradually, students construct personal meanings, or schemata, for instruction.

This view of instruction is sometimes described as the *cognitive mediational paradigm* (Winne & Marx, 1982). Shulman (1986) describes the process cogently:

> The learner does not respond to the instruction per se. The learner responds to the instruction as transformed, as actively apprehended. Thus, to understand why learners respond (or fail to respond) as they do, ask not what they were taught, but what sense they rendered of what they were taught. The consequences of teaching can only be understood as a function of what that teaching stimulates the learner to do with the material. (p. 17)

Hence, students are active; they construct meaning from the instructional text. They monitor and regulate instructional information. In this sense, they are metacognitive much as good comprehenders are (Baker & Brown, 1984; Flavell, 1981; Garner, 1987). For instance, Meloth (1987) reported that students' metacognitive awareness of lesson content is a crucial factor in determining what students learn.

Another line of research influencing educators' notions of instruction comes from Doyle's (1983) research on *academic work*. Doyle defines *academic work* as the conceptual sum of the tasks teachers provide for students plus the information teachers provide about these tasks, including what they count for a grade. According to Doyle, academic work reflects the most prevalent cues students use to make sense of instruction.

To illustrate the power of academic work, consider a study of first grade reading seatwork (Anderson, Brubaker, Alleman-Brooks, & Duffy, 1985). Teachers in this study expected their seatwork assignments on letter-sounds, dot-to-dot drawings, and so on to help students become better readers. However, students (particularly low group students) concluded that the purpose of their seatwork assignments was to "get done." Notice that the academic work (the worksheets assigned each day as seatwork) and students' prior knowledge about how things worked in their classrooms led them to draw a conclusion about (i.e., construct meaning for) seatwork that was consistent with their prior experiences as students but in conflict with their teachers' intentions.

Similarly, when teachers present skill activities to help students become better readers, students often draw conclusions about the purpose of those activities that are quite different (Winne & Marx, 1982; Duffy, Roehler, & Rackliffe, 1986). In short, students always read the instruction teachers provide; often, however, students' understanding about the instruction differs dramatically from the understandings teachers are trying to convey.

Another line of research shaping current instructional views centers on the teachers' mediational role (Clark & Peterson, 1986). Just as students are cognitively active in comprehending instruction, effective teachers are also cognitively active in their efforts to develop students' understandings (see, e.g., the decision-making research reviewed by Clark & Peterson, 1986). Teachers interpret students' verbal and nonverbal actions during instruction and, on the basis of that interpretation, provide students with additional instructional information (Duffy & Roehler, 1987; Roehler & Duffy, 1987). Such teacher activity, designed to bring student understandings in line with intended curricular outcomes, has been referred to as *alternative*

representations (Wilson, Shulman, & Richert, 1987) and as *responsive elaboration* (Duffy & Roehler, 1987). Teachers judge students and make adjustments in their instruction based on the feedback they receive about student understandings.

Finally, research on explicit instruction has influenced new research on teacher effectiveness (Duffy, Roehler, Meloth, & Vavrus, 1986; Pearson & Dole, 1987; Pearson & Gallagher, 1983). Because students' instructional understandings, like their comprehension of text, represent, to varying degrees, their inferences about teachers' intended messages, explicitness influences what students learn. The more explicit an instructional cue, the more likely students are to infer a teacher's intended curricular goals unambiguously. That is, explicitness increases the likelihood that students' inferences about instructional information will match teachers' intentions. Further, when teachers are explicit, students demonstrate significantly greater amounts of metacognitive awareness of lesson content (Duffy, Roehler, Sivan, et al., 1987).

The explicit instruction that is advocated here is not the same as the direct instruction that was advocated in the 1970s, although there are some similarities. Both emphasize explicit cues by teachers about what is going to be learned, guided practice of the to-be-learned material, and application to independent situations. However, there are three major differences. There is no assumption that the strategy will be broken down into componential subskills. The strategy is modeled, practiced, and applied to the whole comprehension task. There is no single correct answer or a single best way to apply a particular strategy. The strategy is modeled in a variety of ways and with different tasks. There is no feedback about the correctness of applying a particular strategy; rather, the adaptability and flexibility of strategies are emphasized (Pearson & Dole, 1987).

Taken together, these views of instruction suggest that instruction, like comprehension itself, is complex and fluid. Under a drill-and-practice model, the teacher's role was essentially one of insuring student attention to the task. In the cognitive mediational paradigm, the teacher engages in what Shulman (1986) calls *pedagogical representations and actions*:

> There are ways of talking, showing, enacting or otherwise representing the ideas so that the unknown can come to know, those without understanding can comprehend and discern, the unskilled can become adept. (p. 20)

Identifying these pedagogical representations and actions is our next agenda.

Effective Instructional Actions

Earlier views of comprehension instruction emphasized the teacher's role as a director and manager of practice. In a cognitively based view of comprehension instruction, the teacher becomes a mediator who helps students construct understandings about: (a) the content of the text itself; (b) strategies that aid in interpreting the text; and (c) the nature of the reading process itself. Elements of this perspective are seen in virtually all comprehension instruction research (see, e.g., Duffy, Roehler, Sivan, et al., 1987; Palincsar & Brown, 1984; Paris & Jacobs, 1984; Pearson, 1985). Taken as a whole, such instruction can be described as consisting of four kinds of instructional actions: planning, selecting academic work, providing information, and restructuring student understandings.

Planning. Traditionally, teacher planning has been regarded as static; that is, instructional dialogue and actions were planned in advance and then followed much

like scripts found in many teacher manuals of commercial reading programs. However, planning is a much more fluid process (Yinger, 1977). Instruction begins with a plan of teachers' intentions; however, as soon as a lesson begins, teachers modify the plan to accommodate students who, in the process of interpreting instructional information, create their own meanings (Duffy & Roehler, 1989b; Duffy, 1990). Effective teachers respond to students' restructured understandings by modifying their plans. This recursive process of reciprocal mediation by teachers and students continues throughout the lesson. Hence, planning remains a crucial component of effective instruction. It is not a script to follow but a blueprint from which teachers make adjustments in response to students' emerging understandings (Raphael, Englert, & Anderson, 1987; Roehler, Duffy, & Warren, 1988).

Selecting academic work. Selection of academic work to be pursued during any lesson or series of lessons is a crucial instructional action because students make sense of instruction by reference to their academic work (Doyle, 1983). Academic work in reading provides students with experiences in reading; these experiences become part of their knowledge about what reading is and how it works and, as such, part of what they use to make sense out of subsequent reading tasks. At a more subtle level, academic work also includes the environment in which the academic work is situated—what some label the *situational context* (Brown, Collins, & Duguid, 1989). For instance, when the academic work associated with reading is embedded in situations comparable to how literate people actually use reading, students construct different meanings about reading than when academic work in reading is embedded in contrived activities, such as workbook exercises (Duffy, Roehler, & Rackliffe, 1986). As such, academic work is a crucial determinant of both student understandings and student motivation to pursue a reading task.

Three examples of different kinds of comprehension instruction illustrate the power and range of academic work. Each represents an appropriate kind of academic work, but student learning about comprehension is different in each.

Perhaps the most common kind of academic work in comprehension instruction is answering teacher-generated questions about texts (Durkin, 1978–1979). When the questions are developed from a careful analysis of a given text (see Beck, Omanson, & Mckeown, 1982; Ogle, 1986) and when the students' academic work is to answer those questions, students build understandings about the content of a particular text. When the goal of comprehension instruction is to develop an integrated understanding of the text, this kind of academic work is highly effective. For instance, the traditional directed reading lesson relies heavily on teacher-generated questions about the text content; given this kind of academic work, students conclude that comprehension is knowing the content of a given text.

Reciprocal teaching (Herrmann, 1988; Palincsar & Brown, 1984) represents a different kind of academic work. In this case, students share equally in dialogues about predictions, questions, summaries, and clarifications. The students' academic work is to participate in the dialogue about these tasks. Given this kind of academic work, students conclude that comprehension involves consistently making predictions, asking questions, summarizing, and clarifying parts of the text.

One last kind of academic work focuses students' attention on the reasoning processes expert readers use when they read (Duffy, Roehler, Sivan, et al., 1987; Herrmann, 1988). Students receive explicit explanations of the way expert readers think and reason when they read. The students' academic work is to adapt and apply

the cognitive strategies that teachers model. Given this kind of academic work, students conclude that comprehension involves using particular strategies in adaptive, flexible ways.

In sum, the academic work students engage in leads them to think in particular ways about comprehension and the comprehension process. Consequently, teacher selection of academic work is crucial to students' conceptions of what comprehension is. Cognitive views of comprehension suggest that students need to construct understandings about the content of the text, useful strategies to aid in interpreting the text, and the reading process itself. Thus, different types of academic work are appropriate to develop these different understandings.

Providing information. A third instructional action is to provide students with information. Because instruction is designed to help students build conceptual understandings of curricular goals (in this case, reading comprehension), students need information about what comprehension strategies are and how they might be used to improve understanding of a given text. That is, they must have experiences that provide appropriate information about those strategies (Duffy & Roehler, 1989a).

Research suggests that such information should be explicit (Baumann, 1984; Baumann, 1986; Duffy, Roehler, & Sivan, et al., 1987; Pearson, 1985). Other research suggests that providing information about the usefulness of what is being taught can help motivate students. For instance, Pressley, Snyder, and Cariglia-Ball (1987) reported that information helps students gain control of their learning, and Sivan and Roehler (1986) found that teacher statements about usefulness raise student consciousness and thereby promote motivation.

One effective way of providing information is teacher modeling, in which teachers explain the mental reasoning involved in performing various reading tasks. The goal is not to have students replicate the teacher's modeling or thinking but, rather, to have teachers provide sufficient scaffolding for learning to take place. The effectiveness of this kind of teacher modeling depends upon at least three factors. The first is the explicitness of the information presented (Duffy, Roehler, Sivan, et al., 1987; Pearson, 1985). Modeling that provides explicit, unambiguous information is more effective than vague or jumbled information (Duffy, Roehler, & Herrmann, 1988). The second is flexibility; modeling that demonstrates flexible adjustment to text cues is more effective than modeling that emphasizes rigid rules or procedural steps (Duffy & Roehler, 1989a). The third is specificity. If teachers, for instance, merely ask questions without explaining the reasoning employed to answer those questions, many students have difficulty understanding how the questions were answered (Duffy, Roehler, Sivan, et al., 1987). Consequently, students do not gain control of the process of answering questions, and their comprehension suffers (Bereiter, 1986; Duffy, Roehler, & Herrmann, 1988).

Restructuring student understandings. Teachers provide information during the instructional period, but there is often a difference between teachers' instructional intentions and students' instructional interpretations. As a lesson progresses, effective teachers get feedback from students regarding their understandings. They use that feedback to elaborate information, which, in turn, helps students restructure their understandings. This process becomes a continuous interactive cycle (Palincsar, 1986; Raphael, Englert, & Anderson, 1987; Roehler, Duffy, & Warren, 1988).

Helping students restructure their understandings is a subtle instructional enterprise that is just beginning to be understood. The process requires that teachers use

information provided by students as a form of informal assessment. In addition, on the basis of this assessment, effective teachers spontaneously create instructional scaffolding—cuing, prompting, analogies, metaphors, questioning, elaborations, and remodeling—to provide students with the necessary information that will help them restructure their understandings (Duffy & Roehler, 1987). As students move from what Vygotsky (1978) called the *other-directed to self-directed* stages of understanding, teachers gradually diminish the scaffolding. This diminished assistance has been referred to by Pearson and Gallagher (1983) as the *gradual release of responsibility.* The teacher assumes much of the responsibility for building student understandings early in lessons, but, as lessons progress, students assume more and more of the responsibility.

Providing such instructional scaffolding is particularly subtle when done across lessons as well as within lessons (Duffy & Roehler, 1989b; Roehler, Duffy, & Warren, 1988). Instructional objectives are not met at the conclusion of a 30 minute lesson. Rather, it takes many lessons for teachers to help students build understandings about the global nature of strategic reading, the different types of reading strategies and the relationships between them, the adaptation of different kinds of strategies, and the combining and recombining of strategies. For example, it took four weeks of instruction and a variety of instructional activities for Brown, Dole, and Trathen (1990) to teach fifth grade students a prior knowledge prereading strategy that students were able to transfer successfully to independently read selections. The success of these types of instructional activities depends not only on scaffolding provided in individual lessons but also on appropriate and gradual diminishing scaffolding across lessons and time (Duffy, 1990).

To summarize, then, research suggests that instruction can be characterized as a process in which teachers attempt to make learning sensible and students attempt to make sense of learning. Teachers and students negotiate instructional meaning. Teachers' instructional actions in this negotiation focus on planning the understanding to be developed, selecting academic work that will develop those understandings, providing explicit information to help students interpret academic work accurately, and providing gradually diminished assistance as students move closer and closer to independent use of the intended curricular outcomes.

Conclusions

As a result of recent research on the reading process and on teaching, a new model of comprehension instruction can now be envisioned, one quite different from the traditional model currently in use in most schools. In rapid retreat is the view that comprehension ability consists of the independent sequential development of a set of hierarchically related skills, each learned to some level of mastery. Reading is now viewed as an active process in which readers select from a range of cues emanating from the text and the situational context to construct a model of meaning that represents, to some degree, the meaning intended by the writer. Further, the development of reading comprehension ability is better viewed as a process of emerging expertise, where readers develop strategies for comprehending increasingly sophisticated texts in increasingly complex situational contexts. Teacher scaffolding can be viewed as the complement of emerging expertise. The greater the student expertise, the less teacher scaffolding required for successful completion of a task. Additionally, learning is viewed as an active, constructive process in which

students select a range of cues from the instructional environment to construct a model of meaning that represents, to some degree, the meaning intended by their teachers. And, teaching is viewed as another active, constructive process in which teachers and students mediate and negotiate meaning from the instructional environment.

Instructional Recommendations

The research synthesized here suggests some foundational principles for a reading comprehension curriculum. The strategies and instructional plans and actions identified in this review should not be construed as representing an exhaustive and/or inclusive list of what to teach or how to teach it. We have intentionally limited ourselves to the domain of comprehension and wish to make no analogical claims about other features of a reading curriculum. Nevertheless, several guidelines can be extrapolated and used to establish a beginning framework for comprehension instruction in the 1990s.

Reading develops as a process of emerging expertise. Regardless of the age and ability of the reader, the central goal of reading is always the construction of meaning. What changes over time is the level of sophistication of the reader's expertise and the amount of conceptual and contextual support teachers need to provide.

Reading strategies are adaptable and intentional. Good readers have in mind a few ideas about how to construct meaning from text, and they are able to alter their strategies based on their purpose, task and text demands, and situational context.

Reading instruction is adaptable and intentional. Just as good readers have in mind a few ideas about how to construct meaning from text, teachers also have in mind a few ideas about how to build student understandings about the comprehension process. Effective teachers, like good readers, alter their instructional actions based on their purpose, task and text demands, student responses, and situational context.

Reading instruction involves careful scaffolding. Teachers use examples, explicit instruction, modeling, and elaboration to provide sufficient scaffolding necessary for students to learn particular strategies. Over time, the scaffolding gradually diminishes as students learn to use and apply the strategies on their own. Scaffolding may be reassembled depending upon the text and task demands and then dismantled again as students gradually become independent users of the strategies.

Reading and reading instruction are highly interactive and reciprocal. The meanings that students develop for the texts they read are complex negotiations involving an author, a teacher, and a community of peers. The meanings that students develop about the instruction they receive are similarly complex negotiations among teachers, authors, and a community of peers. Teachers and students interact to build, share, and revise models of meaning about given texts being read, about the reading process, and about the instructional process itself. Such interactions present a complicated picture of comprehension instruction; even so, an awareness of and understanding about this complexity is crucial for effective instruction to take place.

Future Research

We have learned much about the reading comprehension process and about comprehension instruction in recent years, but even more awaits our study. For example, regarding the issue of what to teach, which of the strategies we have identified are necessary and sufficient for the improvement of comprehension abili-

ties? What has been left out? How do strategies develop over time? Even though strategies look similar at different levels of sophistication, should they be introduced differently? Most strategy training work has been completed in the middle and secondary schools. Should strategies be emphasized at the very beginning reading stages, and, if so, which ones can young children be expected to understand and make use of?

We also do not know how much of the comprehension curriculum should be spent on the teaching of reading strategies versus other types of activities. How, for example, should strategy instruction time be balanced against such things as decoding skills, free reading, authentic reading and writing activities, and teacher-led discussions of stories?

Similarly, we need to know more about the instructional process. Are the pedagogical plans and actions presented here necessary and sufficient for helping students become strategic readers? Are some teacher actions more important than others? What types of students will require different types of scaffolding? How long will it take students to learn to use and adapt particular reading strategies flexibly? And, how do we help teachers learn to engage in the subtle instructional processes, particularly scaffolding, described here?

Finally, we need research on the role that indirect instruction plays in helping students become better comprehenders. The instructional research presented here has focused on the explicit teaching of comprehension. But it is certain that young children and older students alike also learn about the reading comprehension process in indirect ways. Some, in fact (see Carver, 1987), suggest that comprehension strategies should (perhaps can only) be learned indirectly through repeated application. Still others (see Brown, Collins, & Duguid, 1989) suggest that the best way to develop effective transferrable cognitive strategies may be to teach students as though strategies were bound to specific situations. The appropriate balance between indirect instruction and explicit instruction is unknown at this time, but it is in dire need of research.

Note

[1] The notion of *prior knowledge* seems redundant. All knowledge, in order to affect cognition, must exist in memory prior to a cognitive act. Even more confusing is what to call the knowledge that gets added in Pages 1–4 to *prior knowledge* when the impact of knowledge on the comprehension of ideas is considered on Page 5.

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