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Teaching Reading Comprehension Strategies to Students With Learning Disabilities: A Review of Research

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We review the body of research on reading comprehension for students with learning disabilities. First, we describe the factors that lead to the comprehension difficulties of these students. Next we describe our procedures for reviewing the literature on effective instructional methods for this population. Next we review the body of studies involving instructional methods for improving the comprehension of narrative text. This is followed by the research on techniques for improving the comprehension of expository text. We conclude with a discussion of ongoing issues in the field—in particular, (a) the increased use of socially mediated instruction, (b) the need to teach multiple strategies to students to improve comprehension, and (c) controversies in how important it is to explicitly teach specific strategies versus merely providing flexible frameworks to structure dialogue on texts read.

In this article, we provide a comprehensive review of intervention research conducted over the past 20 years on comprehension instruction for students with learning disabilities. We begin with a brief overview of current understandings of the difficulties experienced by students with learning disabilities related to comprehending text. We then briefly outline our literature search procedures. Next we review studies investigating the efficacy of an array of teaching strategies for improving comprehension of narrative text, followed by an analysis of studies examining benefits associated with teaching strategies for understanding expository text. We conclude with a discussion of unresolved issues and directions for future research.

In 1977, the term *learning disabilities* was included as a category of exceptionality in the Education for All Handicapped Children Act (P.L. 94-142). Since then, the percentage of students with learning disabilities has increased steadily so that these students now constitute 7% of the school-age population and more than half of all children receiving special education services (U.S. Department of Education, 1999).

By definition, students with learning disabilities experience unexpected failure to learn, and most states have adopted an approach to identification whereby a discrepancy between intellectual capacity and academic achievement constitutes evidence of a learning disability.

Of course, controversy over learning disability identification methods persists (see, for example, Fletcher, 1995; May; L. Fuchs & D. Fuchs, 1998; Kavale, Forness, & Lorsbach, 1991; Mercer, King-Sears, & Mercer, 1990; Reschly, 1996; Shinn, Tindal, Spira, & Marston, 1987) because a learning disability is a “soft” form of disability, for which no biological marker currently is known, because the number of students with learning disabilities has increased precipitously since 1974, and because technical problems concerning the measurement of discrepancies between intellectual capacity and academic achievement exist. Despite this controversy, one finding is incontrovertible. That is, the vast majority (at least 80%) of students with learning disabilities experience serious problems learning to read (Kavale & Reece, 1992). Moreover, a meta-analysis (D. Fuchs, L. Fuchs, Mathes, & Lipsey, 2000) reveals that students with learning disabilities experience more severe forms of reading problems than do poor readers who have not been identified as learning disabled: The effect size reflecting this difference is approximately six tenths of a standard deviation; when measures require efficient responding, the effect size increases to more than 1 standard deviation. Furthermore, This pattern of performance pertains to difficulties not only in decoding but also in comprehending text.

The contemporary view holds that learning disabilities stem from a broad array of difficulties with tasks involving language and abstractions (e.g., Kolligian & Sternberg, 1987; Swanson & Hoskyn, 1998). This view highlights the importance of understanding the nature of the reading comprehension problems experienced by students with learning disabilities and using that information to develop instructional approaches that enhance comprehension abilities of those students.[1]

Students’ Difficulties Related to Comprehension of Text

Strategic Processing and Metacognition

Over the years, several different conceptions of the nature of learning disabilities have influenced research and practice (Wixson & Lipson, 1991). The older idea that some deficiency in one or more of the basic components of cognitive processing causes disabilities has given way to the current view that inefficiency rather than deficiency most accurately characterizes the problems experienced by students with learning disabilities. In other words, while students with learning disabilities possess the necessary cognitive tools to effectively process information, for some reason they do so very inefficiently. Most researchers suspect that the breakdowns occur in the domain of strategic processing and metacognition (i.e., students’ ability to control and manage their cognitive activities in a reflective, purposeful fashion).

Many problems can arise in the strategic processing of text. For example, students may not possess appropriate strategies for problem situations. They might not realize that they should actively monitor their comprehension and consequently do not go back and reread passages that are confusing, as proficient readers do. In addition, they may not know when to use a strategy they, in fact, do possess. In fact, some comprehension strategies can be daunting to employ, especially for young children.

During the 1980s, researchers focused on the metacognitive problems many students with learning disabilities experience while reading. Metacognitive ability refers to the ability to manage and control one's cognitive activities and evaluate whether or not they are performing successfully. Several instructional interventions were developed to build metacognitive awareness in students by attempting to teach them how to monitor their comprehension, thereby improving their strategic processing of material and making them more active readers.

Can failure to read strategically and to spontaneously monitor understanding of textual material be overcome by interventions that teach children successful reading strategies or other cognitive skills? Wong and Wilson (1984) demonstrated that when provided with appropriate opportunity, students with learning disabilities can learn to sort disorganized sentences into coherent clusters around subtopics. Moreover, with instruction, they seem to understand what constitutes an organized paragraph. This study was seminal in demonstrating that instruction can improve strategic processing for students with learning disabilities. Since 1984, a good deal of research has been devoted to instructional approaches that focus on the acquisition, generalization, and monitoring of the cognitive and metacognitive abilities needed for successful reading.

At the same time, theorists such as Kolligian and Sternberg (1987) note that cognitive psychologists have tended to focus too heavily on cognitive and metacognitive aspects of higher-level tasks such as reading and devote too little attention to other factors crucial to comprehension. Those factors are (a) knowledge of text structures, (b) vocabulary knowledge, (c) using background knowledge while reading, (d) the role of fluent reading in comprehension, and (e) the importance of task persistence. In the following sections we provide a brief overview of research supporting the importance of each of these factors in fostering comprehension.

Knowledge of Common Text Structures

Descriptive research of the 1980s helped us understand that students with learning disabilities possess limited knowledge of the different types of textual organization and structure. In particular, they displayed a limited knowledge of the differences between narrative text structure (stories) and expository text structure (designed to inform or explain).

Narrative Text Structure

Children without disabilities develop a sense of how stories are typically structured, which aids in their comprehension. Much of this knowledge is developed before students learn to read, and once they begin reading on their own, they expect stories to unfold in certain ways. When they begin to read expository material, they more easily develop a set of expectations for what the structure might be like than do students with learning disabilities. Research suggests that knowledge of text structures leads students to ask relevant questions about the material they are reading as they are reading it.

For example, when students know story grammar, the basic text structure for narrative texts, they recall more of the information representing major story-grammar categories than other information in the story (Hansen, 1978; Weaver & Dickinson, 1982; Williams, 1993). They also recognize which story events are closely related to the basic causal chain in a story (Wolman, 1991). In other words, story grammar knowledge helps students discern what is likely to be most relevant for understanding the story.

Students with learning disabilities typically develop this knowledge of narrative text structure at a much slower rate than their peers. Using a story-production task, Cain (1996) found that students with learning disabilities showed less knowledge of story structure than did younger children matched on comprehension skill. Many interventions addressing comprehension of narrative text have been devoted to (a) building this structural knowledge of stories and then (b) teaching students how to use their knowledge of text structure to analyze the stories they read (e.g., Gurney, Gersten, Dimino, & Carnine, 1990; Idol & Croll, 1987). We discuss these studies further in the section of this article regarding interventions for narrative text.

Expository Text Structure

The comprehension difficulties of students with learning disabilities may be explained, in part, by their limited knowledge of expository text structures. Seminal research by Meyer, Brandt, and Bluth (1980) found that readers who are unaware of text structure do not approach text with any particular plan of action. Consequently, they tend to retrieve information from the text in a seemingly random way. Students aware of text structure, on the other hand, tend to "chunk" or organize the text as they read. When examined by researchers, the chunks retold by proficient readers reveal the text structures used to organize the text. They differ dramatically from the rather idiosyncratic retellings of less proficient readers.

Anderson and Armbruster (1984) identified six major structures for organizing expository material: (1) description (of characteristics, traits, properties or functions), (2) temporal sequence of events, (3) explanation (of concepts or terminology), (4) definition-example), (5) compare- contrast, and (6) problem-solution-effect. It is important to realize that few texts are written exactly according to any one of these six formats. Most chapters in content area texts, for example, would be considered a hybrid of several of these structures (Armbruster, Anderson, & Meyer, 1991; Dimino & Kolar, 1990). However, authors do rely on these structures as they develop passages or segments in chapters in books. Proficient readers are aware of them as they approach expository text. They use these structures for "building internal connections" or making "logical connections among ideas from the text" (Mayer, 1984, p. 32).

The empirical literature provides the basis for three major conclusions concerning text structure and comprehension of expository text. First, awareness of text structure is acquired developmentally (Brown & Smiley, 1977; Danner, 1976; Englert & Hiebert, 1984). Second, some text structures are more obvious and easier for readers to comprehend (Englert & Hiebert, 1984). Third, skill at discerning text structure—and then using it—seems to be important for comprehension of expository text (Hiebert, Englert, & Brennan, 1983; Taylor, 1980; Taylor & Beach, 1984; Taylor & Samuels, 1983).

Research shows clearly that students with learning disabilities have little awareness of narrative or expository text structures, or both, and consequently experience difficulties using them as aids in comprehending text (Taylor & Williams, 1983; Wong & Wilson, 1984). For example, Wong and Wilson showed that, compared to normally developing children, students with learning disabilities were less aware of passage organization (i.e., text structure) and had more difficulty reorganizing disorganized passages than were students without learning disabilities. Both Englert and Thomas (1987) and Taylor and Williams (1983) demonstrated that children with learning disabilities have more difficulty comprehending what they read than do children without disabilities, even when the level of decoding ability is controlled. These students could not distinguish between essential and nonessential material and tended to have difficulties formulating reasonable hypotheses based on what they read (Englert & Thomas, 1987). Often their hypotheses did not show comprehension of the interrelationships communicated by a text, (i.e., the text structure). Corroborating evidence suggests that capacity to comprehend expository text may be related to the complexity of the text structures used by the authors, as well as students' capacity for using text structure to generate questions and hypotheses (Wilson & Rupley, 1997).

In extending this work, Englert and Thomas (1987) demonstrated that students with learning disabilities not only lacked sensitivity to basic text structures, but also that this unawareness affected their capacity to understand expository material. Students with learning disabilities performed less well in formulating hypotheses about upcoming details based on interrelationships communicated by the text; they could not distinguish between essential and nonessential material, as Taylor and Williams (1983) had earlier found. Furthermore, the students with learning disabilities in both of these studies seemed unaware of their inability to comprehend. These effects were replicated even when the text was read aloud to the students with learning disabilities, in an effort to forestall comprehension problems stemming from decoding difficulties.

Wong (1980) also demonstrated the limited abilities of students with learning disabilities to organize information on their own. She found that they recalled as many main ideas as their peers did when questions were used to prompt responses. However, they performed significantly more poorly when not provided with prompting questions. Hansen (1978) found that, compared with their normal achieving peers, students with learning disabilities did not recall as much main idea information (although the two groups performed comparably well in the amount of detail information they recalled). Both studies provide important insights that have helped guide instructional research. These studies help illuminate the relationship between knowledge of text structures and ability to read strategically.

Importance of Vocabulary Knowledge

Students with learning disabilities also have difficulty with much of the vocabulary used to communicate academic concepts. Understandably, comprehension depends not only on the readers' general background knowledge regarding the topic at hand, but also on their familiarity with the terminology and vocabulary used in the text (Anderson & Pearson, 1984; Bos & Anders, 1990). Students with learning disabilities typically bring less of this knowledge to the reading task than do those without disabilities, and their comprehension suffers accordingly.

The relationship between reading comprehension and vocabulary knowledge is strong and unequivocal (Baumann & Kameenui, 1991; Paul & O'Rourke, 1988; Stanovich, 1986); and although the precise causal nature of the relationship is not completely understood, it does seem to be largely reciprocal. In other words, vocabulary knowledge contributes to reading comprehension (Stanovich, 1986) and grows through reading experiences (Cunningham & Stanovich, 1998). It is important to note that this relationship holds true for readers at all skill levels. Even weak readers' vocabulary knowledge is strongly correlated with the amount of reading they do (Cunningham & Stanovich, 1998).

It may be somewhat surprising to learn that most researchers agree that although students do learn word meanings in the course of reading connected text, the process seems to be fairly inefficient and not especially effective (Beck & McKeown, 1991). Beck and McKeown state that "research spanning several decades has failed to uncover strong evidence that word meanings are routinely acquired from context" (p. 799).

A few studies have helped illuminate the effects of learning the meaning of words through normal reading activities. For example, Jenkins, Stein, and Wysocki (1984) found that students learned the meaning of words after encountering them six or 10 times within a text. However, if students were told the definitions before reading the passage, two encounters were sufficient to produce positive effects. Jenkins and colleagues also investigated the impact of various vocabulary interventions on both word knowledge and comprehension of passages among students with learning disabilities. Pany, Jenkins, and Schreck (1982) compared several treatments that varied in the amount of direct instruction provided. Students read sentences containing target words and synonyms, read definitions of target words, and practiced using target words in sentences. Results indicated that practice was critical to optimum learning. When students practiced using the target words, they learned more synonyms and their sentence comprehension improved, demonstrating transfer of learning.

However, Pany et al. (1982) found that on two general measures of passage comprehension (a cloze test and a story-retell test), vocabulary instruction had no effect. Attempting to explain these discrepancies, the authors raised an interesting possibility. They noted that if the content of the passage is familiar to the student, knowing the meaning of every word may not be crucial. General understanding of the topic and knowledge of the text structure used in the story may help compensate for limited vocabulary knowledge.

Appropriate Use of Background Knowledge While Reading

Williams (1993) has proposed another source of difficulty for students with disabilities. In interviews geared toward understanding students' comprehension of stories that had been adapted from a natural text and their ability to identify story themes, it was found that adolescents with learning disabilities performed below the level of same-age students without learning disabilities. These adolescents performed at the same level as younger students without learning disabilities matched on scores of standardized reading comprehension. However, on one sensitive measure of theme identification (incipient awareness of theme), students with learning disabilities scored below the younger students without learning disabilities. Also, the students with learning disabilities had greater difficulty in identifying the important information during their summarization and discussion of the story than did students without disabilities, and such difficulty was associated with poorer theme identification. The findings suggest that students with learning disabilities have specific difficulty getting the point—perhaps because they build up less effective text representations through the inappropriate use of background knowledge or the intrusion of personal points of view.

Another study involving adolescents with learning (Williams, 1991) drew the same conclusion. This study also involved narrative text. The frequency of idiosyncratically identifying important points of the story correlated negatively with the number of appropriate predictions (based on text information) of what the main character would do to solve a particular problem. That is, students who tended idiosyncratically to introduce into stories inaccurate or irrelevant information also had more difficulty making accurate predictions based on story content. This difficulty is sometimes called cognitive inhibition and directly relates to difficulties in monitoring cognitive processes.

Bos and Anders (1990) have also stressed how limited or fragmented knowledge of the topics covered in readings, especially expository readings, has a detrimental effect on students' comprehension. They argue that teachers need to spend time building students' knowledge of the topics before reading.

The Role of Reading Fluency in Comprehension

Cunningham and Stanovich (1998) eloquently articulated the interrelationships between reading fluency and comprehension:

> Slow, capacity-draining word recognition processes require cognition resources that should be allocated to comprehension. Thus reading for meaning is hindered; unrewarding reading experiences multiply; and practice is avoided or merely tolerated without real cognitive involvement. (p. 8)

The rationale for building reading fluency skills is that when too much attention is allocated to low-level processes such as word recognition, not enough attentional resources are available to accomplish the higher-order processing involved in comprehension (LaBerge & Samuels, 1974). High correlations between oral reading fluency measures and standardized measures of reading comprehension support the logic of this position (Deno, Mirkin, & Chiang, 1982; Fuchs, Fuchs, & Maxwell, 1988; Jenkins & Jewell, 1993).

Early research by Jenkins, Barksdale, and Clinton (1978) with students who have learning disabilities showed that although an intervention designed to increase reading rates led to greater reading fluency, it had no impact on comprehension. The authors also found that comprehension instruction, although effective in increasing comprehension, did not lead to concomitant increases in oral reading fluency.

Later studies have been somewhat more promising. In Armstrong's (1983) more elaborate study, for example, boys with learning disabilities were given a one-page story at an easy reading level and another at a more difficult reading level. (The levels had been predetermined for each student individually, based on the number of words read correctly per minute.) The students read the stories both aloud and silently, and then they answered comprehension questions. Reading rate was higher and comprehension was superior on the easy story. This study suggested that oral reading measures and reading comprehension performance are indeed linked, a conclusion that has also been reached by many other researchers.

Another technique to build fluent reading—having a student read a text multiple times—has been given a great deal of attention. This technique, called "repeated readings," was introduced by Samuels (1979). Repeated readings result in a virtually automatic decoding of a passage, and the improved accuracy and fluency lead to improved comprehension. It is, of course, more of a challenge (and more important in terms of adopting this technique in actual instruction) to demonstrate that such training, with repeated readings, will lead to improvements in the reading of passages that have not been practiced.

Rashotte and Torgesen (1985) showed that, for students with learning disabilities, such generalization from one passage to another depends on the number of words the passages have in common. When passage overlap was minimal, there were no greater effects from four readings of the same passage than from reading each of four different passages once.

Sindelar, Monda, and O'Shea (1990) compared the effects of repeated readings for students with learning disabilities and students without disabilities matched on reading ability. Screening measures were reading rate, errors made in oral reading, and story propositions retold (as a comprehension measure). Participants read third-grade stories at one of two difficulty levels—either a mastery level (faster than 100 words per minute) or an instructional level (between 50 and 100 words per minute). They read them either once or three times and the screening measures were repeated at posttest. Both reading rate and recall were better after three readings than after one reading, and the effects of repeated readings were comparable for both readers with and without disabilities. Also, repeated readings were effective for students reading at both the mastery and the instructional levels.

Overall, it is clear that a strong relationship exists between reading fluency and comprehension. However, the exact nature of the relationship is unclear. Research sometimes—but not always—demonstrates that interventions that increase reading fluency also enhance students' comprehension abilities. In fact, it may be essential to teach comprehension directly, and the use of repeated readings as part of a complete instructional program may be a reasonable approach.

A major problem identified in descriptive research studies is that, when compared with students without learning disabilities, students with learning disabilities have limited background knowledge for reading most texts. Knowledge gaps in history, geography, and science interfere with how well students with learning disabilities understand the material they are expected to understand. Most contemporary approaches to reading comprehension instruction (e.g., Bos & Anders, 1990; Klingner & Vaughn, 1996; Palincsar & Brown, 1984) include an assessment of students' background knowledge and encouragement of students to ask peers or the teacher when they lack relevant background knowledge (Klingner & Vaughn, 1996).

The Importance of Active Reading and Task Persistence

Reading is a complex activity. It requires the successful selection, application, and monitoring of multiple strategies (Wixson & Lipson, 1991), and children with learning disabilities have great difficulties acting on these requirements. More than 20 years ago, Torgesen (1977) identified such students as "inactive learners." This conceptualization was supported by a study in which students were taught specific techniques to increase retention of material read (such as how to underline). Even with such techniques, students with learning disabilities displayed erratic improvements in reading performance, unlike their peers without disabilities (Torgesen, 1982). It is important to note that many comprehension strategies are capacity demanding and may seem daunting (especially for younger children). Thus, students must be taught, coaxed, and encouraged to use strategies that they are only beginning to master (DeWitz, 1997; Pressley & McCormick, 1995).

Indeed, one characteristic of students with learning disabilities that hinders reading comprehension is their limited task persistence. This characteristic was highlighted in a large observational study by McKinney, Osborne, and Schulte (1993).

Motivation and persistence affect performance in all academic areas and are clearly related to students' developing a sense of failure and frustration in the presence of academic tasks. The accumulation of repeated unsuccessful efforts to solve academic problems decreases their motivation to work hard at learning. In the context of reading, Stanovich (1986) suggests that students soon begin to select environments that minimize academic engagement with reading activities at school (e.g., avoiding classes that require large amounts of reading), as well as after-school recreational reading.

Special education research has emphasized techniques to enhance task persistence through (a) reinforcement (extrinsic motivators), (b) intrinsic motivation, and (c) increased rates of interaction with peers regarding instructional matters (i.e., peer-mediated and socially mediated instruction). This is an important emphasis because cognitive research increasingly stresses that above and beyond knowledge of learning strategies, task persistence is a major element in comprehension for all students, especially for expository text (DeWitz, 1997). In other words, a major movement in the field of comprehension has been to develop teaching approaches that actively encourage students to persist in figuring out what the text is saying (e.g., Beck, McKeown, Sandora, Kucan, & Worthy, 1996).

Bearing in mind the results of the foregoing studies, we devote the remainder of this article to a review of instruction intervention geared toward building comprehension strategies in students with learning disabilities so that they can independently read with understanding. The review is divided into two sections—narrative and expository—and is followed by a discussion of unresolved issues in instructional research on this topic. First, we describe the procedures we used to exhaustively review the relevant literature and determine which studies would be included.

Literature Search Procedure

Two broad categories of intervention studies were examined—those that focused on interventions in the narrative domain and those that focused on interventions in the expository domain. Our objective was to identify students within the entire spectrum of high-incidence disabilities, but all of the studies that met our inclusion criteria focused specifically on students with learning disabilities.

We used the following procedures to locate studies for review. First, we used the bibliographies of three recent meta-analyses that addressed reading comprehension or interventions, or both, with students: Mastropieri, Scruggs, Bakken and Whedon (1996a), Rosenshine and Meister (1994), and Swanson (1987). These sources provided us with our pool of potential studies published before 1997. For articles published from 1997 through June 1999, we conducted a manual search for studies that addressed reading comprehension issues for students with learning disabilities.

The following journals were included in the manual search: *American Educational Research Journal; B. C. Journal of Special Education; Child Development; Cognition and Instruction; Discourse Processes Education and Treatment of Children; Education and Treatment of Children; Exceptional Children; Journal of Curriculum Studies; Journal of Educational Psychology; Journal of Learning Disabilities; Journal of Reading Behavior; Journal of Special Education; Learning Disabilities Research, Learning Disability Quarterly; Psychology in the Schools; Psychology of Learning and Motivation; Reading and Writing Quarterly; Overcoming Learning Difficulties; Reading Psychology: An International Quarterly;*

Reading Research Quarterly; Reading, Writing, and Learning Disabilities; Remedial and Special Education; Review of Educational Research; and *Scientific Studies of Reading.*

To ensure that we had included all relevant studies, we also consulted four expert researchers in the area of reading comprehension or special education: Janice A. Dole (University of Utah), Robert Jiménez (University of Illinois), Michael Pressley (Notre Dame University), and Sharon Vaughn (University of Texas). We asked them to identify studies that may have been overlooked. We also asked these researchers to comment on what they considered the major findings in reading comprehension research and future directions.

To include a study in this research synthesis, we used the following criteria. The study must have

- Been published in refereed journals before June 1999
- Been conducted with school-age students
- Used an experimental or quasi-experimental design in which an intervention was implemented to improve the reading comprehension performance of students with disabilities
- Included students with learning disabilities as either the primary focus, or data analysis procedures to determine the effects of the experimental intervention specifically on students with learning disabilities
- Included at least one quantitative measure of reading comprehension.

As previously stated, the results of our study are presented in the context of the two types of text students encounter, narrative and expository. We preface each presentation with brief examinations of the nature of the text in question and the direction of research to improve its comprehension.

Improving Comprehension of Narrative Text

The Nature of Narrative Text

Generally, narrative text is easier to comprehend and remember than expository text. The two primary reasons for this are (a) the content of a narrative, what it talks about, is usually more familiar than the content of an exposition; and (b) the structure of most narrative text is simpler than the structure of most expository text. For these two reasons, stories (narratives) are ubiquitous in beginning reading instruction. When children start to learn to read, the first texts they encounter are likely to be narratives.

A narrative depicts sequences of events involving characters and their actions, goals, and feelings. Such event sequences correspond in many ways to the sequences of events that children experience directly and that constitute the core content of their world knowledge. More abstract forms of knowledge (e.g., taxonomic and causal reasoning) are constructed from event knowledge. Language plays a large role in building up knowledge: Children hear other people talking about events, they watch television and movies, and they describe and justify their own experiences. In these ways, they vicariously gain knowledge about the world.

The stories given to children in the early grades offer a natural transition from oral to written language (Westby, 1985) and provide opportunities to gain knowledge that is more wide ranging than could be gained from personal experiences alone. Stories not only help develop important basic academic skills but also other cognitive and social skills.

A story is structured in a particular way: It describes a temporal sequence of events concerning one or more characters, and it reflects the goals of the characters. A general outline of the structure of a story would include the setting, the characters, a goal (sometimes called the problem), a series of actions presented in episodes, internal reactions of the characters, and a resolution or outcome. Researchers call such outlines story grammars and have shown that having some knowledge of the basic structure of a story aids comprehension and recall. Note that this is an aspect of world knowledge, too: knowledge of the way in which stories are organized.

It is not surprising that a great deal of research has been conducted on narrative text. Much of this work has focused on story structure as an organizing framework. Even preschool children use story structure. For example, when a story is presented in scrambled form so that the components of the underlying story grammar are not in their typical order, preschool children remember less of it (Mandler & Johnson, 1977). This early ability to use knowledge of story structure to aid comprehension continues to improve with age (Trabasso & Stein, 1997). Older children are better than younger children at identifying important story information, such as characters and goals and such subtle story events as the feelings of the characters (Beach & Wendler, 1987; van den Broek, 1997). They also are better able to make inferences (Oakhill, 1984; Oakhill & Garnham, 1988) and to identify story themes (Lehr, 1988; Williams, 1993).

Teaching Strategies for Reading Narrative Text

Given the low performance in reading comprehension among students with learning disabilities and the reasons advanced to explain why performance is low, what steps are being taken to try to improve it? Over the last 12 years, a good deal of intervention research has been dedicated to this question. Table 1 lists the relevant studies, which we review as follows.

Chan, Cole, and Barfett (1987) taught a cross-referencing technique to 11-year-old students with learning disabilities and eight-year-old regular-education students matched on word-recognition level. The students were asked to detect internal inconsistencies in adventure stories in which two anomalous sentences had been inserted. One instructional condition, the task of monitoring text for inconsistency, was demonstrated. However, the teacher did not explain why particular sentences were inconsistent. In the explicit instruction condition, the teacher provided an explanation of why certain sentences were inconsistent. During instructional sessions students were actively involved in deciding which stories contained anomalies. It is important to note that explicit strategy instruction did not benefit students without disabilities. However, it did help students with learning disabilities both in detecting anomalies and in improving their general comprehension of stories. The explicit training provided instruction in the use of the strategy. It also provided a clear explanation of the criterion task. The fact that only a small amount of training (on two passages) was given, however, suggests that the students had the cognitive ability before the study but that they could not use that ability without support.

Using a different strategy, Idol-Maestas (1985) developed an advance organizer called "tells fact or fiction" to orient students with learning disabilities before they read. Her advance organizer (a comprehension-probing exercise) was designed to encourage students to pay attention, activate students' prior knowledge, and incorporate teacher guidance. She formulated the organizer into an acronym on the basis

TABLE 1
Studies on improving comprehension of narrative text

Carnine, D., & Kinder, B. D. (1985). Teaching low-performing students to apply generative and schema strategies to narrative and expository material. *Remedial and Special Education, 6*, 20–30.
Chan, L. K. S., & Cole, P. G. (1986). The effects of comprehension monitoring training on the reading competence of learning disabled and regular class students. *Remedial and Special Education, 7*, 33–40.
Chan, L. K. S., Cole, P. G., & Barfett, S. (1987). Comprehension monitoring: Detection and identification of text inconsistencies by learning disabled and normal students. *Learning Disability Quarterly, 10*, 114–124.
Fuchs, D., Fuchs, L. S., Mathes, P. G., & Simmons, D. C. (1997). Peer-assisted learning strategies: Making classrooms more responsive to diversity. *American Educational Research Journal, 34*, 174–206.
Fuchs, L. S., & Fuchs, D. (1994). Academic assessment and instrumentation. In S. Vaughn & C. Bos (Eds.), *Research issues in learning disabilities: Theory, methodology, assessment, and ethics* (pp. 233–245). New York: Springer-Verlag.
Gurney, D., Gersten, R., Dimino, J., & Carnine, D. (1990). Story grammar: Effective literature instruction for high school students with learning disabilities. *Journal of Learning Disabilities, 23*, 335–348.
Idol, L. (1987). Group story mapping: A comprehension strategy for both skilled and unskilled readers. *Journal of Learning Disabilities, 20*, 196–205.
Idol, L., & Croll, V. J. (1987). Story-mapping training as a means of improving reading comprehension. *Learning Disability Quarterly, 10*, 214–229.
Newby, R. F., Caldwell, J., & Recht, D. R. (1989). Improving the reading comprehension of children with dysphonetic and dyseidetic dyslexia using story grammar. *Journal of Learning Disabilities, 22*, 373–380.
Paivio, A. (1971). *Imagery and verbal processes*. New York: Holt, Rinehart & Winston.
Williams, J. P., Brown, L. G., Silverstein, A. K., & deCani, J. S. (1994). An instructional program in comprehension of narrative themes for adolescents with learning disabilities. *Learning Disability Quarterly, 17*, 205–221.

of previous works showing that acronyms are effective in reminding adolescents with learning disabilities of the required steps in a strategy (e.g., Schumaker, Deshler, Alley, Warner, & Denton, 1984). Idol-Maestas's strategy, "TELLS," consisted of the following steps: (T) study story titles; (E) examine and skim pages for clues as to what stories are about; (L) look for important words; (L) look for difficult words; (S) think about the story settings and decide whether stories are "fact or fiction."

Idol-Maestas (1985) worked with four elementary school students with learning disabilities, ages 8 to 12. She used an experimental single-subject design with a multiple baseline. On each day of baseline, students read a story aloud of at least 100 words taken from a basal reading series. After each story, the researcher asked the students 10 comprehension questions, including questions requiring inferences; she also assessed reading accuracy. Likewise, in the intervention phase, the students read stories and answered the same types of questions; additionally, they completed the tell fact or fiction advance organizer. Students first read each probe (e.g., What is the title? Does it give a clue as to what the story is about?) and then responded. The teacher offered guidance if needed. When a stable pattern of at least 80% correct comprehension was established, participants were returned to the initial baseline condition and were told that they could use the tell fact or fiction strategy if they wished. All four participants improved their performance on the comprehension questions during interventions, and when the interventions were removed, performance declined. The students also improved their grade-equivalent scores on the Gray Oral Reading Test (reflecting accuracy and rate), as measured before and after the study, and three of the four students also improved on a test of listening comprehension.

In another study, Jenkins, Heliotis, Stein, and Haynes (1987) taught students in grades three to six to restate in their own words—and in writing—what happened in each paragraph of a story as they read. The authors evaluated the intervention by pairing 32 students on the basis of pretest scores and assigning those pairs randomly to the intervention or to a control condition. Working with a text that replicated the training conditions—that is, students were explicitly directed to use the restatement procedure—the restatement intervention group recalled more story information than the control group did. They also answered more comprehension (recall) questions. In a near transfer test, the students read a story in normal format (no lines for writing restatements), and they were given an additional sheet of paper but no directions for its use. Of the 16 instructed students, 13 spontaneously used the restatement procedure, and the intervention group showed performance superior to that of the control group. In a remote-transfer text condition, in which students read a story in a normal format without additional writing materials, the intervention group retained its superiority. This finding suggests that they had adopted a covert form of the restatement procedure.

An important aspect of the study is that students were taught to answer two generic questions ("Who?" and "What's happening?") to be used as guides in formulating their restatements. The purpose of this procedure, as explained by the researchers, was to enhance students' active processing of the text; therefore, it qualifies as comprehension monitoring. However, the questions also served as an organizational guide to the structure of narrative text, albeit much more simplified than the guides used in most studies focusing on text structures.

As those three studies show, students with learning disabilities can be guided to improve their comprehension of narrative text, including the ability to draw inferences by using a prereading strategy that activates attention and prior knowledge or by on-line activation of strategy use. This does not necessarily mean, however, that improvement will be maintained when the teacher's guidance is removed. Indeed, as previously stated, most researchers agree that a major reason for the poor performance of many children with learning disabilities is failure to read strategically and spontaneously monitor understanding of what is being read. This view has led to a major focus on remediation. Can such a deficiency be overcome by intervention that explicitly teaches these strategies?

Much research has been devoted to instructional approaches centering on acquisition of the cognitive and metacognitive abilities needed for successful reading. These approaches address the two components of metacognition: (a) awareness of the skills, strategies, and resources necessary for success; and (b) control of those skills, strategies, and resources so that effective performance is achieved. An essential component of reading with understanding, then, is the ability to reflect on a task and to examine and evaluate how well it is being carried out. To teach this means teaching knowledge, making students aware of the state of their comprehension, and providing them with repair strategies when they determine that they are not understanding the text adequately. This is typically called "comprehension monitoring," and the next series of studies we describe focuses on this topic.

Comprehension Monitoring of Narrative Text

Comprehension monitoring studies demonstrate the potential for strategies that activate prior knowledge to enhance comprehension before reading or that teach students to use ongoing strategies to help process tests as they read. For example, Chan and Cole (1986) worked with 11-year-old students with learning disabilities in the fifth and sixth grades and eight-year-old regular-education students in the third grade. The two groups were matched on reading level. They were given training in how to remember what they read; a toy robot was used as a motivational device and to demonstrate the strategies. Short passages consisting of descriptive information in story form were used.

Students were assigned to one of four experimental conditions. In the first condition, students were taught to generate questions about the content of each paragraph they read. In the second condition, they were taught to underline two interesting words in the passage and then explain why they were interesting. In the third condition, both the self-questioning and the underlining techniques were taught. The fourth condition was designed to control for the additional instructional time spent on each paragraph; students in this group reread the story. After each passage, students were given multiple-choice questions and were provided with feedback about their answers.

Results demonstrated the usefulness of metacognitive training for students with learning disabilities. Students in all three groups who were taught strategies performed at higher levels on the reading comprehension test than did those in the control group. This indicated that the students needed explicit training because those in the control group, without training, did not use strategies that would have helped them understand the text. However, for the students without disabilities, there were no differences between the three conditions in which strategies were taught and the control condition. This suggests that the children without disabilities used some sort of cognitive strategy even when they were not explicitly taught to do so. The finding that strategy instruction helps students with disabilities, but does not necessarily help students without disabilities, has also been noted by Wong (1979) and Wong and Jones (1982). In these studies, the researchers found that teaching questioning strategies to students with disabilities can be effective, but teaching these same strategies to normally achieving students is usually superfluous.

There are important implications that no significant differences among the three experimental conditions were found. Chan and Cole (1986) suggested that improvement had accrued not because of the specific strategies taught, but because students in these conditions had been experienced active interaction with the texts. This active interaction triggered the use of strategies that the students possessed, but which as inactive learners they did not normally use.

Despite these impressive findings, it is important to know whether students continue to use the strategies in their classrooms and outside of school after instruction concludes. Chan and Cole (1986), therefore, later asked the students to read another two passages, without mentioning the robot or the strategies they had learned. Only the students in the underlining-only group used that strategy, and their performance on the multiple-choice questions was superior to that of the other three groups. The authors speculated that underlining may have been easier than generating questions. The students also enjoyed underlining, which was done with fluorescent markers. Overall, however, these results are disappointing, or at best mixed, regarding the potential for maintenance of metacognitive strategies. Indeed, this conclusion about problematic maintenance seems to hold true even for populations other than students with learning disabilities (Kenney, Cannizzo, & Flavell, 1967; Ringel & Springer, 1980).

In addition to highlighting the potential problems with maintenance of strategies, research of Paivio's (1971) dual-coding theory, which asserts that learning may be either verbal or visual, has been invoked as a foundation for the development of visual imagery training. In a study by Rose, Cundick, and Higbee (1983), elementary students with learning disabilities read stories, presented to them one paragraph at a time. They next answered comprehension questions after undergoing one of three mnemonic teaching conditions. In the first condition, "verbal rehearsal," they were instructed to talk aloud to themselves, as needed, after every few sentences. In the second condition, "visual imagery," they were instructed to close their eyes after every few sentences and take mental pictures or movies about what they were reading. In the third condition, "unaided recall," the students were told simply to concentrate. Both strategy groups outperformed the unaided recall group, but the visual imagery group performed no better than the verbal rehearsal group did. Over the years, interest in visual imagery as a metacognitive strategy has waned, largely due to the lack of promising findings and because children report that imaging requires considerable cognitive effort during reading (Rose et al., 1983).

Questioning Guided by Narrative Text Structure: Story Grammar

Many studies focus on a strategy involving analysis of a narrative's text (Gurney et al., 1990; Idol & Croll, 1987; Singer & Donlan, 1982). Students are taught to identify the principal components of a story and then to use this knowledge as an organizational guide when reading. That is, they learn to look for those components as they are needed. Story-grammar strategies taught to students with learning disabilities closely follow a literature on strategies taught to students without disabilities. These studies provide persuasive evidence that such strategies are effective for students with learning disabilities.

Idol and Croll (1987), for example, taught five intermediate-level elementary students with mild learning handicaps (IQs in the high 80s) and poor reading comprehension (as judged by their teachers). An instructional procedure was designed that taught story structure as an organizational framework, using teaching techniques that have been found to be helpful for poor learners (precise teacher presentation and feedback techniques coupled with multiple opportunities for practice). Instead of presenting the students with a series of questions, the story-structure instruction used a story map, because the authors felt that the students required something concrete. Components of the story map included setting (characters, time, and place), problem, goal, action, and outcome. The students read a story or a story segment aloud for 20 minutes each day at a reading level at which comprehension was poor but rate and accuracy were relatively high. They then retold the story from memory and orally answered 10 comprehension questions geared to the story-structure outline.

Four of the five students demonstrated strong gains in comprehension across the dependent measures, which included performance on the comprehension questions, and length and quality of story retell, as well as performance on standardized reading tests. This indicated the power of story mapping; indeed, although generic questions were used during the baseline, those alone did not lead to improvement. All four students also maintained their mastery level of 80% correct comprehension when they were no longer directed to use the story-mapping strategy. There was some indication that these students also improved on standardized reading and on listening comprehension tests. In addition, three of the students showed some generalization to classroom reading materials, a phenomenon difficult to achieve following an experimental training procedure. The fifth student improved marginally on some of the measures, but his slow progress meant that no maintenance phase could occur.

In a related study, Idol (1987) used the same story-structure-mapping strategy and multiple-baseline design, but the strategy was adapted for teaching groups of children with varied abilities at the third- and fourth-grade level. A typical teacher-model, teacher-assist, and independent-practice paradigm was used. Group averages for daily comprehension were maintained above 80% correctness when students were no longer required to use the strategy. Furthermore, improvements generalized to measures of listening comprehension, criterion-referenced tests, and spontaneous story writing, although not to the Nelson reading skills test. Results corroborated the findings of Idol and Croll (1987) concerning the effects of Idol's specific story-mapping instruction; findings also demonstrated that improvements can be achieved without the use of ability grouping.

Also relying on story grammar, Carnine and Kinder (1985) taught elementary students with learning disabilities to generate four generic story-grammar questions. The questions were these: "Who is the story about?" "What are they trying to do?" "What happens when they try to do it?" and "What happens at the end?" The use of this strategy, along with the incorporation of principles of direct instruction, e.g., explicitness, repetition, and feedback (Brophy & Good, 1986; Gersten & Carnine, 1986), led to substantial improvement in performance on short-answer comprehension questions and on free-recall measures. Student gains were maintained 2 to 4 weeks after intervention.

Taking a similar approach, Newby, Caldwell, and Recht (1989) also taught story grammar as a strategy, but their procedure was modified for eight- to 10-year-old children with either dysphonetic or dyseidetic dyslexia. For the dysphonetic children, pictographs were used to capitalize on those children's simultaneous mental processing strengths. The dyseidetic children were given sequentially based instruction, in which the story components were presented in a prescribed order (as they appear in a well-formed story). A multiple-baseline, single-subject experimental design was used. Results showed no clear increase in the amount of story content recalled, but there was a significant improvement in the importance level of the ideas recalled.

This study, too, demonstrated the effectiveness of a metacognitive strategy that focuses on narrative text structure. The treatments for the two types of dyslexic students seemed to be comparably appropriate. The study was not designed to determine whether the differential strategies had specific benefits for matching types of dyslexia or whether general metacognitive training without specific tailoring to subtype was equally effective. Stability of gains after the termination of treatment and transfer effects were not assessed.

In 1990, Gurney et al. examined the effectiveness of a similar instructional strategy for teaching comprehension of literature to high school students with learning disabilities. Seven students, with IQs ranging from 83 to 106 and reading skills ranging from fourth to 11th grade, were given either story-grammar instruction or traditional basal literature instruction for a period of nine weeks. In the story-grammar instruction, theme was identified as a component in addition to the story components typically taught to elementary students. An instructional approach of modeling, guided practice, and independent practice was used. In the other, traditional instructional treatment, the procedures outlined in the teachers' guides for basal readers were followed. These procedures included the teaching of related vocabulary; discussion of background information and oral reading of the (same) stories; answering comprehension questions orally on story details, inferences, and literary techniques; and completing worksheets.

The story-grammar instruction proved to be the more effective technique for teaching students to comprehend important elements in short stories. Interestingly, however, it did not improve students' ability to answer the basal literature questions that typically are found in high school literature anthologies. According to the authors, such questions generally focus on minor, literal details, and they do not represent the desired outcome of high school literature instruction. At the end of the study, a researcher briefly interviewed all students. Most students in the story-grammar treatment reported that the instruction had made them feel more confident about their comprehension.

Gurney et al. (1990) further reported that theme was the most difficult story component to teach, requiring extensive teacher modeling and direct explanation. In fact, theme is usually considered difficult to teach and has not been addressed in most instruction, whether of special education students or others (Purves, 1981). A theme is abstract and, except in the fable genre in which the moral of the story typically appears at the end, is rarely stated explicitly. The reader must go beyond plot-level comprehension to identify a generalizable plot pattern (theme concept) and then even further, as will be explained.

Williams, Brown, Silverstein, and deCani (1994) described an instructional program to help students with learning disabilities learn about the concept of theme, identify themes in stories, and apply themes to real life. The instruction followed the proven effective paradigm of teacher explanation and modeling, guided practice, and independent practice. It focused on teaching story grammar components through organizing (story schema) questions, as in previous studies, and then on teaching theme identification through additional questions. Then, a final set of questions helped students generalize the theme to relevant life situations.

The stories were taken from basal readers and trade books. Several stories exemplified a single theme, such as perseverance. Each of the other stories exemplified a different theme, such as greed and cooperation. Two studies were used to evaluate the program. In the first study, fifth- and sixth-grade students with and without learning disabilities participated; in the second study, seventh and eighth graders with more severe learning disabilities participated. In both studies, the program improved comprehension of the concept of theme and identification of the theme (perseverance) that had been emphasized in instruction. Students who had been given the instructional program were more successful on both measures than were students who received either no instruction or traditional instruction. Traditional instruction involved teaching techniques currently found in basal readers, including prereading discussion, vocabulary development, oral reading of the story, and then questions and discussion related to both factual details of the story and inferences derived from it.

Applying a theme to real-life situations and identifying and applying themes not included in instruction were more difficult, especially for students with more severe learning disabilities. However, the latter group of students did show improvement on recall of story detail. Taken together, these findings indicated that even students with severe learning disabilities can profit from instruction focused on abstract, higher-order comprehension.

Peer-Mediated Instruction in Reading Comprehension

Although studies demonstrated the potential for strategy instruction with students with learning disabilities, few have concentrated on teacher delivery within naturally occurring classroom settings. A notable exception is the work of D. Fuchs, L. Fuchs, Mathes, and Simmons (1997). They conducted a research program that goes beyond the evaluation of the effects of experimenter-controlled strategies to the design of a comprehensive "classroom package." Peer-Assisted Learning Strategies, or PALS (D. Fuchs et al., 1997) is a classwide, one-to-one, peer-tutoring program involving partner reading, paragraph summary, prediction, and other such activities to encourage students to practice strategies that have been shown to strengthen reading comprehension. The program is the result of extensive earlier work on classwide peer tutoring (Cohen, Kulik, & Kulik, 1982; Levin & Meister, 1986; Levin, Glass, & Meister, 1984).

In the study, 20 teachers implemented PALS for 15 weeks, and another 20 teachers did not. Students in the PALS classrooms demonstrated greater reading progress on all three measures of reading achievement used: words read correctly during a read-aloud, comprehension questions answered correctly, and missing words identified correctly in a cloze (maze) test. The program was effective not only for students with learning disabilities but also for students without disabilities, including low and average achievers.

Summary of Narrative Intervention Research

Strategy instruction seems to consistently improve students' ability to see relationships in stories, answer comprehension questions, and retell what they have read in a more focused fashion. Use of story-grammar elements to improve comprehension of narrative text should be considered best practice for students with learning disabilities. Each research study used a somewhat different approach; yet, many common elements traverse all the interventions. In particular, students were invariably provided with a structure (usually story-grammar elements) to help them focus on relevant information. Teachers frequently modeled use of the story-grammar elements. Extensive teacher feedback was virtually always provided.

In all of these studies, the positive effects of an intervention were most likely to accrue on measures closely aligned to the specific instruction provided. Typically, the impact of the intervention was not as strong on transfer measures. Generalization to measures that are less specifically tied to the intervention goals is more difficult to achieve, especially among students with learning disabilities. As an illustration of this effect, Fuchs and Fuchs (1994) evaluated the performance of students whose teachers incorporated either many or few story-grammar questions into their instruction. Measures closely aligned to the story-grammar strategy, such as retelling, which assesses the ability to organize and remember important story information, demonstrated the largest effects. The Stanford Achievement Test, which involves reading passages and answering multiple-choice questions, showed moderate effects. By contrast, the teachers' use of story-grammar instruction had no effect on reading fluency, a measure least related to the intervention.

Improving Comprehension of Expository Text

Obviously, as readers progress through school, the demands and expectations placed on them change. For students in the early grades, teachers rely heavily on stories for reading instruction (Nichols, 1995; Wilson & Rupley, 1997). However, when children enter the fourth grade, they are increasingly expected to work with expository material—i.e., material about history, science, geography, social studies, and other disciplines (Wilson & Rupley, 1997). In fact, most reading beyond the primary grades involves expository text, as does most reading that adults find necessary to succeed at work and everyday life (Stanovich & Siegel, 1994). Science, technological knowledge, and information about basic economic and social science principles are acquired, for the most part, by reading expository material. Such written material becomes increasingly important as American society becomes technologically more advanced (Lapp, Flood, & Ranck-Buhr, 1995). Unfortunately, however, expository text often is so dense with information and unfamiliar technical vocabulary that students must perform fairly complex cognitive tasks to extract, summarize, and synthesize its content (Lapp et al., 1995).

Indeed, research shows that the comprehension of expository material, more often than not, poses greater challenges for readers than narrative material does (Hidi & Hildyard, 1983; McCutchen & Perfetti, 1982). This is true for at least three reasons. First, as Bereiter and Scardamalia (1987) note, expository text involves reading long passages without prompts from a conversational partner. This contrasts not only with narrative text, wherein dialogue is interspersed frequently throughout the text, but also with children's oral language experiences. Second, as Stein and Trabasso (1981) suggest, the logical-causal arguments typical of expository text structure are more abstract than are the events that characterize narratives. The third reason, which receives the most attention in the field of reading comprehension, is that expository texts use more complicated and varied structures than do narratives (Kucan & Beck, 1997).

Most narratives use some variant of the story-grammar text structure. However, a single chapter from an expository text may use several different text structures. Thus, attempts to use text structure knowledge to improve the comprehension abilities of students with disabilities have been fraught with problems (Anderson & Roit, 1993; Armbruster, Anderson, & Ostertag, 1987; Beck, 1997; Pressley, 1997).

As previously noted, the preponderance of research suggests that knowledge of text structures leads students to ask themselves relevant questions about the material they are reading. We also noted that research clearly shows that students with learning disabilities are less able than their normally achieving peers to use the strategies that underlie effective comprehension of expository text. In light of these findings, it is not surprising that children with learning disabilities have more difficulty learning about basic text structures such as compare-contrast and cause-effect. Nevertheless, as Wong and Wilson (1984) demonstrated, when provided with appropriate opportunities, students with learning disabilities can learn to sort disorganized sentences into coherent clusters around selected subtopics, and with instruction, they seem to understand what constitutes an organized paragraph.

Although it is clear that students with learning disabilities require careful guidance when learning how to extract relevant information from expository texts, conventional instruction rarely provides such guidance (Englert & Thomas, 1987). In the following section, we explore and evaluate interventions designed to improve students' strategic reading skills.

The major method investigated for enhancing student comprehension of expository text is strategy instruction, which is based on the assumption that readers must cope with a broad range of texts. Rather than circumvent, modify, or supplement text, the focus of strategy instruction is to improve how readers attack expository material, to become more deliberate and active in processing it. In discussing research on this method, we first present investigations of single strategies and then examine studies of multiple strategies. The studies to be discussed in this section appear in Table 2.

Before proceeding, however, we want to clarify the scope of our discussion. Text structure and readers' strategic behavior are only two factors associated with the comprehension of expository text. Two other major contributors to students' understanding of expository text—(a) prior knowledge, that is, the general knowledge and pertinent topic information they bring to the material, and (b) decoding—have been addressed earlier.

Studies Evaluating Single Strategies

Numerous single-strategy interventions to enhance students' comprehension of expository text have been studied. Interventions include the use of passage organization training, self-questioning procedures, a mapping organizer, an elaborative interrogation strategy, SQ3R (Survey, Question, Read, Recite, Review [Robinson, 1941]), generalization induction, summary skills training, and instruction on question-answer relationships.

In an early investigation, Wong and Wilson (1984) taught, to 21 fifth- and sixth-grade students with learning disabilities who had demonstrated difficulty with disorganized passages, a multistep strategy for reorganizing expository text. The multistep strategy required students to sort the sentences, check the sentences, put the sentences in the right order in each paragraph, and then get ready to tell the story. After the experimenter demonstrated this strategy, the students applied it to two practice passages, and the experimenter provided corrective feedback. The students then reorganized, studied, and retold one disorganized passage. The students not only reorganized this final passage to criterion levels of performance, but also retold more compared with their own previous retellings with organized and disorganized passages. The effects were clear. However, the study was conducted in a laboratory-like setting within a short time frame, involved a measure only indirectly connected to reading, and included no demonstration of classroom applicability or maintenance over time.

In a related study, Wong and Jones (1982) examined the effects of a self-questioning procedure. After eighth- and ninth-grade students with learning disabilities were taught the main idea, they were assigned randomly to either a self-questioning group or control group. The self-questioning group followed a five-step

TABLE 2
Studies on improving comprehension of expository text

Boyle, J. R. (1996). The effects of a cognitive mapping strategy on the literal and inferential comprehension of students with mild disabilities. *Learning Disabilities Quarterly, 19*, 86–98.

Chan, L. K. S. (1991). Promoting strategy generalization through self-instructional training in students with reading disabilities. *Journal of Learning Disabilities, 24*, 427–433. Darch, C., & Kameenui, E. J. (1987). Teaching LD students critical reading skills: A systematic replication. *Learning Disability Quarterly, 10*, 82–91.

Englert, C. S., & Mariage, T. V. (1991). Making students partners in the comprehension process: Organizing the reading "POSSE." *Learning Disability Quarterly, 14*, 123–138.

Gajria, M., & Salvia, J. (1992). The effects of summarization instruction on text comprehension of students with learning disabilities. *Exceptional Children, 58*, 508–516.

Graves, A. W. (1986). Effects of direct instruction and metacomprehension training of finding main ideas. *Learning Disabilities Research, 1*, 90–100.

Klingner, J. K., Vaughn, S., & Schumm, J. S. (1998). Collaborative strategic reading during social studies in heterogeneous fourth-grade classrooms. *Elementary School Journal, 99*, 3–22.

Labercane, G., & Battle, J. (1987). Cognitive processing strategies, self-esteem, and reading comprehension of learning disabled students. *B.C. Journal of Special Education, 11*, 167–185.

Malone, L. D., & Mastropieri, M. A. (1992). Reading comprehension instruction: Summarization and self-monitoring training for students with learning disabilities. *Exceptional Children, 58*, 270–279.

Mastropieri, M. G., Scruggs, T. E., Hamilton, S. L., Wolfe, S., Whedon, C., & Canevaro, A. (1996). Promoting thinking skills of students with learning disabilities: Effects on recall and comprehension of expository prose. *Exceptionality, 6*, 1–11.

McCormick, S., & Cooper, J. O. (1991). Can SW3R facilitate secondary learning disabled students' literal comprehension of expository test? Three experiments. *Reading Psychology: An International Quarterly, 12*, 239–271.

Nelson, J. R., Smith, D. J., & Dodd, J. M. (1992). The effects of a summary skills strategy to students identified as learning disabled on their comprehension of science text. *Education and Treatment of Children, 15*, 228–243.

Schumaker, J., Deshler, D., Alley, G., Warner, M., & Denton, P. (1984). Multipass: A learning strategy for improving reading comprehension. *Learning Disability Quarterly, 5*, 295–304.

Simmonds, E. P. M. (1992). The effects of teacher training and implementation of two methods of improving the comprehension skills of students with learning disabilities. *Learning Disabilities Research and Practice, 7*, 194–198.

Swanson, H. L., Kozleski, E., & Stegink, P. (1987). Disabled readers' processing of prose: Do any processes change because of intervention? *Psychology in the Schools, 24*, 378–384.

Wong, B. Y. L., & Jones, W. (1982). Increasing metacomprehension of learning disabled and normally achieving students through self-questioning training. *Learning Disabilities Quarterly, 5*, 228–240.

Wong, B. Y. L., & Wilson, M. (1984). Investigating awareness of and teaching passage organization in learning disabled children. *Journal of Learning Disabilities, 17*, 477–482.

procedure: Identify why this passage is being studied, find main ideas and underline them, think of a question for each main idea, answer these questions, and review the questions and answers to see how they provide more information. Training was delivered in two 2-hour sessions. On a series of passages administered over four days, trained students answered more questions correctly but did not do better on retelling. This seminal study demonstrated the promise of self-questioning techniques. It is unfortunate that little information was provided on how students achieved mastery of the main idea concept—a potentially challenging task, which reportedly was accomplished in a single one-hour session.

In a more robust test of a single strategy applied under laboratory-like conditions, Swanson, Kozleski, and Stegink (1987) examined the effectiveness of a mapping organizer on the strategic reading behavior and reading comprehension performance of two adolescents with learning disabilities. Students were instructed to take notes, using a mapping strategy during tape-recorded presentations of passages. The purpose of this generic visual-spatial aid was to guide learners in building a coherent outline of the text. Outcomes included an analysis of the students' strategic behavior, recall performance on training passages, and answers to short questions related to novel passages. With training in the mapping strategy, students' strategic behavior improved, although the nature of the enhanced strategic behavior did not correspond specifically to the treatment. Moreover, although recall performance on the trained passages increased, no effects were demonstrated on the transfer passages.

Boyle (1996) also investigated the effects of a cognitive mapping strategy with middle school students. In his study, two thirds of the sample were students with learning disabilities; the remaining one third were students with mild mental retardation. A mnemonic provided the first letter in each step of the mapping procedure, which students were taught to apply first with below-grade and then with instructional-level material. Feedback was provided only on initial practice. Later, sessions were used for outcome measurement, on which students in the experimental group outperformed students in the control group. Unfortunately, on more distal outcome measures, there were no significant differences. These findings echoed those of Swanson et al. (1987).

In another laboratory-like investigation, this time looking at an elaborative interrogation strategy, Mastropieri, Scruggs, Hamilton, Wolfe, Whedon, & Canevaro (1996b) taught seventh- and eighth-grade students with learning disabilities to "reason actively through information presented in each sentence" (p. 1). At the end of each sentence within passages on facts about vertebrate animals, students were told to ask themselves, "Why does that make sense?" In individual sessions, the experimenter modeled self-questioning and coached the students through several examples. After this introduction, the students were instructed to apply the strategy as they read. Students in the experimental group produced significantly more correct explanations of information than did students in the control group, but did not recall more information from those passages. The authors concluded that more intensive, direct coaching, prompting, and guided practice would be necessary to realize intended effects.

Chan's (1991) findings corroborate this possibility. Fifth- and sixth-grade students with reading disabilities were taught in small groups to ask themselves three to five questions for four different topics: deleting redundant information, deleting trivial information, locating topic sentences, and identifying main ideas. Half of the children participated in a standard instructional condition, in which they were provided with a demonstration of how to ask themselves the designated set of questions while reading a passage and how to look for answers. Then the children practiced the strategy on their own. The other half of the students was in a generalization-induction condition, which incorporated cognitive modeling, overt external guidance, overt self-guidance, faded self-guidance, and covert self-guidance.

In line with Mastropieri et al.'s (1996b) hypothesis, more extensive teacher modeling of the strategy and extensive teacher guidance of how students actually used the strategies exerted an important effect on students' capacity to identify main ideas independently. Although students in both conditions improved their identification of the main ideas when prompted to do so, students in the generalization-induction condition performed better than those in the standard instruction condition during unprompted sessions. Unfortunately, because no control group was used, we do not know whether students performed better than comparable students might have performed as a function of simple practice.

In accord with Mastropieri et al.'s (1996b) views and Chan's (1991) findings, four additional studies of single-strategy instruction incorporated greater teacher modeling and extensive supervision of students' as they practiced using the strategy. Two of the studies demonstrated greater success than the others.

Darch and Kameenui (1987) contrasted two methods for helping students with learning disabilities to detect invalid arguments in text. Both treatments were delivered in 40-minute lessons for 12 consecutive school days. One treatment incorporated direct teacher modeling of use of the specific rules and strategies to detect faulty arguments; the other relied less on teacher modeling, with discussion and workbook activities as the predominant mode of presentation. Most outcome measures were linked directly to the task of detecting faulty arguments; one measure, however, also incorporated more general comprehension questions. On the faulty argument detection tasks, students in the direct-instruction group outperformed contrast students. Yet, this skill at detecting faulty arguments failed to translate into differences on the comprehension question measure; moreover, the newly acquired critical reading skills failed to transfer to untrained but related tasks.

Examining a potentially more generalizable treatment, McCormick and Cooper (1991) incorporated into their study teacher-directed lessons of SQ3R, a well-known and strongly advocated study approach for expository text. SQ3R involves surveying passages; formulating questions about titles and subheadings; reading, reciting, or restating the details found under each subheading; and reviewing by self-testing one's own memory of the information contained in each subheading. Despite teacher-directed lessons that ensured student application of the strategy, SQ3R failed to effect superior recall among high school(adjudicated students with learning disabilities. The authors concluded that SQ3R might not have been sufficiently powerful to counter difficulties with the text structure of expository material.

Employing the combination of a comprehensive teacher-support structure and potentially more robust treatments, Nelson, Smith, and Dodd (1992) examined the effects of a summarization strategy on five elementary-age special education children within the context of a summer remedial program. They documented positive results. These researchers taught children a two-component, nine-step summary skills strategy in conjunction with a summary writing guide that visually organized students' application of the strategy. Importantly, teachers (a) taught students to use this strategy carefully, emphasizing its purpose and importance; (b) described the steps in the strategy and the reason for each step; (c) modeled the strategy's use; and (d) provided students with opportunities to describe and practice it.

In every instructional session, the teacher followed a three-part teaching script, reviewing and modeling every step of the strategy. Then they provided guided practice. To engage students actively, the teacher used self-instruction statements, encouraged students to help the teacher, and often discussed the importance of thinking to themselves while reading and completing summaries. In this single-subject design study, students generated summaries and completed short reading comprehension tests at the end of each session. As with McCormick and Cooper (1991), the data were collected in conjunction with the instructional sessions. In contrast to McCormick and Cooper or Darch and Kameenui (1987), the data persuasively demonstrated improvement on both types of outcomes as a function of the training.

In a similarly promising way, Gajria and Salvia (1992) relied on direct instruction of five rules for summarizing text to improve the reading comprehension of students with learning disabilities in grades six through nine. Thirty students, characterized as adequate decoders but poor comprehenders, were assigned randomly to experimental or control treatments. With experimental students, small instructional groups incorporated a mastery-learning paradigm that guaranteed acquisition of the rules. After a rationale for learning the summarization strategies was presented, the first summarization rule was described and modeled, and students were provided paragraphs for applying this rule. They practiced until a mastery criterion was achieved. After each rule was mastered in isolation, students received instruction and guided practice in the combined use of the five rules. Gradually, students assumed increasing responsibility for applying and checking application of the rules.

As in the Nelson et al. study (1992), which taught a broadly applicable summarization strategy using systematic, explicit instruction, effects were positive. Experimental students outperformed their contrast counterparts, as well as normal comparisons, on summarization and factual questions. In addition, experimental students made impressive gains on the Gates-MacGinitie Comprehension Subtest.

The study of single strategies with perhaps the greatest external validity (Simmonds, 1992) examined the utility of the Question Answer Relationships (QARs) strategy. Students were taught to categorize three levels of comprehension questions as Right There (text explicit), Think and Search (text implicit), and On My Own (script implicit). Twenty-four special education resource teachers used the QARs strategy to teach students the three types of questions; contrast teachers used traditional methods to provide instruction on distinguishing among the question types. Four 45-minute lessons, conducted over two weeks, with one additional week devoted to maintenance, incorporated systematic fading of teacher support with immediate, corrective feedback.

Results showed that experimental students performed better than students in comparison groups on question-answering and maze tasks constructed by the teacher using actual classroom social studies material. The treatment was conducted by the teachers themselves in naturally constituted groups, with more than 400 students with learning disabilities. The effects were consistent across measures, which were only distally connected to the treatment. Consequently, the findings were impressive, and the study design supported external validity.

What can we conclude from these investigations of single-strategy instruction? One pattern in the database suggests that careful teacher modeling of strategies and monitoring of strategy use is potentially important. This approach to teaching comprehension makes overt the process of applying a strategy and gives students carefully structured practice opportunities, with systematic fading of teacher support and monitoring of student mastery. In fact, the most persuasive effects in the database, demonstrated by Nelson et al. (1992), Gajria and Salvia (1992), and Simmonds (1992), may have occurred because of teacher modeling and monitoring of strategy use (sometimes referred to as teacher mediation). Unfortunately, three features of the database make it difficult to interpret overall effects. First, Nelson et al.'s addition of a generic visual-graphic aid also may have helped students apply the strategy. They also demonstrated effects only on measures that were related proximally to instructional sessions. Second, specific instructional strategies differed across the relatively successful set of studies. Third, findings provide limited information about maintenance and transfer effects.

Consequently, the database on single-skill strategy instruction for students with disabilities is small (i.e., 11 studies dedicated to expository text). This limited database provides tentative support for the potential importance of careful teacher modeling and monitoring of strategy use. It does not, however, persuasively demonstrate the capacity to achieve maintenance or transfer effects.

Studies Evaluating Multiple Comprehension Strategies

As with single-strategy investigations, studies evaluating the simultaneous use of more than one strategy examine alternative outcome measures that represent a continuum with respect to their proximity to training conditions. They also vary in terms of their laboratory-like settings and the explicitness of the instruction provided. We organized these studies into two sets: those that used two strategies, combining summarization of main ideas with self-monitoring, and those that incorporated more than two strategies.

Four studies combined summarization with one or more forms of self-monitoring training. Malone and Mastropieri (1992) contrasted this two-component treatment with a summarization-only and a control condition. Students with learning disabilities were trained on narrative text. Recall measures were administered two days after training. These measures relied on three types of novel passages not used during instructional sessions: (a) "posttest of training" measures were narrative passages into which lines had been inserted (as was done during training) to prompt students to generate summaries, (b) "near-transfer" measures were narrative passages with no inserted lines, and (c) "far-transfer" measures were expository social studies passages. Both treatment groups outperformed control groups on all measures. The only difference between the two treatment groups favored the performance of the combined method condition on the far-transfer expository passages. Malone and Mastropieri attributed this single difference to the greater demands of expository text, which may have required the addition of a self-monitoring treatment to help students apply the summarization strategy.

With even more persuasive results, Graves (1986) contrasted a control treatment to two experimental conditions: direct instruction on identifying main ideas and direct instruction combined with self-questioning and self-monitoring. In self-questioning and self-monitoring, students recorded their progress through reading passages, repeatedly asking themselves, "Do I understand what the whole story is about?" and recording their answers as they progressed. After four sessions of training, students read outcome passages under a reading aloud condition (as they had been trained to do, with materials cueing students to self-monitor). Then they read outcome passages silently, again with materials designed to prompt students to self-monitor. Finally, they read passages silently or aloud (student's choice) one week later, with no cues. Each measure required the students to identify main ideas in the passages.

On all three measures, students in the direct instruction with self-questioning and monitoring group outscored those in the direct instruction treatment, who in turn outperformed students in the control group. This outcome suggested that careful teacher modeling of summarization (i.e., direct instruction on identifying main ideas) combined with a self-monitoring strategy enhanced student performance. However, maintenance beyond 1 week was not assessed.

Jitendra, Cole, Hoppes, and Wilson (1998) used a single-subject design to evaluate the use of direct instruction in strategies for discerning the main idea in a passage. Direct instruction was followed by two days of self-monitoring training. This time, long-term maintenance was assessed. Among the four participants with learning disabilities, analysis revealed short-term performance increases on narrative passages similar to those used in training and less pronounced, but clear, increases on expository passages. Additionally, with both types of material, the single-subject design evidenced additional effects associated with the self-monitoring treatment. Maintenance probes conducted six, 10, and 16 weeks after training, in isolation from the main idea strategy training, proved inadequate in activating strategy use over time.

In a subsequent study, Jitendra, Hoppes, and Xin (2000) extended previous work, using a group design with 33 students with learning and behavioral disabilities. The treatment was designed to augment the earlier study by integrating the direct instruction on main idea strategy with the self-monitoring training. In addition, as with Graves (1986) and Chan (1991), the intervention also did a better job of systematically fading the self-monitoring component. Results favoring the experimental over the control group were statistically significant on the posttest training measures, and these effects maintained over six weeks. Unfortunately, effects on the transfer measures were less consistent, with performance on selection, but not production, items favoring the experimental group. The authors attributed problems on the transfer measures to the difficulty of the material and to the inclusion of more implicit main idea statements in the transfer as opposed to the training passages.

Five additional studies examined use of multiple instructional strategies. Schumaker et al. (1984) designed and tested the MULTIPASS strategy. This requires three passes through expository material, with each pass taught to criterion before the next is introduced. In the first, or "survey pass," students became familiar with the main ideas and organization. The students familiarize themselves by reading the chapter title, reading the introductory paragraph, reviewing the chapter's relationship to adjacent chapters, reading major subtitles, looking at illustrations and captions, reading the summary paragraph, and paraphrasing information acquired in the process. In the second, or "size-up" pass, students gained specific information without complete reading. They read each question at the chapter's end. Students checked where in the text the answer could be found and then proceeded through the chapter continually looking for textual cues, transforming cues into questions, skimming surrounding text to find answers to questions, and paraphrasing answers. In the third, or "sort-out" pass, students tested themselves by reading each question at the chapter's end and answering it. If they could answer a question immediately, they checked it; if not, they looked for an answer by identifying in which section the answer might be found and skimming that section, as often as needed, until the answer was found.

The researchers had teachers instruct students in the use of this three-part strategy during individual teaching sessions using the following procedure: First, teachers described the rationale for each step of the strategy; then they modeled the strategy while thinking aloud. Next, they instructed students to rehearse the strategy verbally until 100% criterion performance was achieved. Next, they provided practice and feedback on controlled, instructional level materials. Finally, they provided practice and feedback on grade-level materials. Schumaker et al. (1984) showed that students performed substantially better on 20-item tests of expository materials in both instructional and grade-appropriate material, after having been taught this comprehensive strategy.

In the remaining four studies, each research group also implemented a multiple-component strategy intervention with teacher-mediated instruction. In contrast to Schumaker et al.'s (1984) treatment, these remaining studies all relied on peer-mediation to transfer control of the strategies from the teacher to the students.

Klingner, Vaughn, and Schumm (1998), for example, conducted a study examining the effects of multiple strategies used within peer-mediated groups of five to six students, which combined previewing (eliciting background knowledge and predicting), monitoring and clarifying, generating main ideas, and summarizing. They contrasted this treatment with a control group in which a state-developed instructional guide for covering the social studies content was used. The researchers delivered both treatments within mainstream fourth-grade classrooms. Three experimental classes included a total of eight students with learning disabilities; two control classes included a total of four students with learning disabilities. The experimental strategies were taught in whole-class format over a period of three days. A researcher introduced the set of strategies and modeled their use; then students were invited to use the strategies and "were supported in their efforts to do so" (p. 7). Students took turns modeling strategy use for the class. The researchers monitored the student groups and provided additional scaffolding as necessary during a three-week implementation. Two types of learning measures were used: a test of social studies content covered during implementation and the Gates-MacGinitie Reading Tests. No significant effects for the students with learning disabilities were identified, and insufficient information was provided to calculate effect sizes for these students. As suggested in the database on the use of single strategies, it is possible that these students with learning disabilities may have required greater teacher modeling and feedback to profit from this strategic reading instruction. Three teacher-led, whole-class sessions may have been inadequate. Alternatively, a treatment duration of three weeks may have been too short, or, as indicated in other work on small-group processes (e.g., O'Connor & Jenkins, 1996), the students with learning disabilities may have participated at low levels within these collaborative small groups.

In the remaining three studies that incorporated peer mediation, treatment duration was longer. Teacher modeling and monitoring of strategy use was of longer duration and was faded gradually. Englert and Mariage (1991), for example, developed a generic graphic organizer to correspond to a multifaceted strategic process for use with fourth-, fifth-, and sixth-grade students with learning disabilities. The POSSE treatment used a strategic-processing graphic organizer in combination with the following set of strategies: Predicting ideas, Organizing predicted ideas and background knowledge based on text structure, Searching for the text structure, Summarizing the main ideas, and Evaluating comprehension. Teachers modeled the use of these strategies with the graphic organizer and gradually transferred control for the dialogue supporting use of these strategies to the students. Although lesson dialogues showed that the students with learning disabilities had not fully internalized the strategies during the two-month treatment, those students did increase their strategy knowledge more than control students did. This especially occurred in classrooms where teachers did a good job of transferring control for the dialogue to the students. Moreover, regardless of teachers' transfer of control, students performed better than did comparable controls on recall measures of novel expository passages (which were read to students during testing). Consequently, compared with much of the work reviewed here, Englert and Mariage (1991) constructed a relatively comprehensive treatment, which involved (a) a generic graphic organizer, (b) student- and peer-mediated instruction, and (c) a variety of strategic processing behaviors focused carefully on text structure. With these methods, combined with a longer treatment duration and careful, gradual transfer of methods from teacher to student, these researchers demonstrated impressive transfer effects to novel text, which had not been used instructionally.

In view of these encouraging findings, we expected to find strong effects for the procedurally rich and conceptually related "reciprocal teaching" treatment. Designed by Palincsar and Brown (1984), reciprocal teaching incorporates use of four strategies: asking questions, summarizing, predicting what might be discussed next in the passage, and clarifying any confusing content. As with Englert and Mariage (1991), reciprocal teaching relies on student mediation of dialogues (after teacher introduction, modeling, and gradual shifting of control). This student mediation supports students by making the strategies visible to peers and helping classmates use and practice those strategies. Most work on reciprocal teaching has focused on expository text. Unfortunately, most studies looking at expository text functioning, including those of Palincsar and Brown, 1984, and Palincsar, David, Winn, and Stevens, 1991, have not examined effects for students with disabilities.

In contrast, Labercane and Battle (1987) implemented 28 reciprocal teaching sessions over 14 weeks to test effects with 12 intermediate-grade boys and girls with learning disabilities. They compared the performance of those students to that of a control group of 10 boys but failed to identify significant effects on the Gates-MacGinitie. Although the authors speculated that the lack of differences might be attributed to the difficulty of the Gates-MacGinitie, reliable effects also failed to accrue on the Ekwall Informal Reading Inventory. Nevertheless, as estimated by Rosenshine and Meister (1994), Labercane and Battle's (1987) effect size on the Gates-MacGinitie was respectable: 0.36 of a standard deviation. Moreover, as Rosenshine and Meister (1994) reported, an additional study of reciprocal teaching (Levin, 1989) achieved statistically significant effects on the Stanford Achievement Test for intermediate-age students with learning disabilities. Consequently, other reasons, such as small sample size, may explain Labercane and Battle's (1987) failure to demonstrate statistically significant effects.

Results of research on multiple strategies echo the findings of studies on the use of single strategies. The database, although consisting of only eight studies, suggests the importance of strong teacher modeling and consistent monitoring of strategy use to ensure that students with learning disabilities actually master and apply strategies. The studies also indicate that longer treatment duration may be necessary, and that additional work to explore maintenance effects is required. In contrast to research on single strategies, work on multiple strategies offers the promise of transfer to more generalized measures of reading achievement.

Discussion

The research literature assessing the impact of instructional approaches designed to enhance the comprehension performance of students with learning disabilities is promising. For both narrative and expository texts, strategy instruction seems to consistently improve comprehension performance.

Findings from the studies also provide some direction for how teachers might structure strategy instruction to increase the probability of its effectiveness for students with learning disabilities. It seems that teachers should incorporate careful modeling and provide extensive feedback to students to ensure that these students truly learn and incorporate these strategies into their reading. To encourage maintenance and transfer, teachers should also model how they students can use these strategies as they read across a variety of materials.

The findings suggest directions by text type. For narrative text, teaching story-grammar elements seems to be effective. Expository material is less familiar and less engaging for many students. It also incorporates a greater variety of text structures. Therefore, the simultaneous use of multiple comprehension strategies seems necessary.

Nevertheless, as might be expected when attempting to enhance the performance of students with serious learning difficulties, certain caveats are in order. First, for narrative text and when applying single strategies to expository text, maintenance and transfer are questionable; effects are clearer on measures closely aligned with treatment passages. This is problematic because naturally occurring reading situations always involve novel text. Studies do illustrate, however, the potential for simultaneous application of multiple strategies; with multiple strategies, transfer effects improved, even though their effects were examined using more difficult, expository material. Even with multiple strategies, results illustrate how longer treatment durations may be needed to ensure long-term maintenance of effects.

The Complex and Shifting Language of Comprehension

In this section we briefly describe changes in the language used to describe comprehension instruction, the reasons for the shift, and implications for practice. Although these recent conceptualizations have rarely been reflected in controlled special education research studies, we believe they have implications for both future research and improvement of current practice.

Comprehension instruction is an attempt to teach students how to think while they read. It therefore makes sense that for many years, we struggled to find the right language to describe and operationalize how we teach thinking.

As instructional researchers began to address reading comprehension in the 1980s, the field was required to develop a language for describing the foundational aspects of comprehension instruction. By and large, the research community came to realize that the early language of skill building and task analysis did not fully capture the nature of what transpired during comprehension instruction. Increasingly, researchers borrowed terminology from cognitive psychology, especially after the publication of seminal research conducted at the Center for Study of Reading at the University of Illinois by Anderson and Pearson (1984), Palincsar and Brown (1984), and Pearson and Dole (1987), among others. Researchers began to speak of teaching students two facets of reading comprehension: the strategies and procedures used by proficient readers, and knowledge of the different types of text structures.

The idea was to help poor comprehenders develop a plan of action based on what proficient readers do, and to teach them how information is organized in different types of text (i.e., text structures). From the beginning, researchers were aware that they needed not only to teach students the strategies of more proficient readers, but to help students understand when and how to use such strategies in a flexible, personalized fashion. This effort required the development of a new language.

Because of the concern with flexibility in teaching comprehension to students, researchers began to shift the language used to describe comprehension interventions in the late 1980's. The term *scaffold* often replaced *cognitive strategy* or was used interchangeably with it. The new term implied more flexible and fluid teaching than did *cognitive strategy*. The goal of most scaffolds is to encourage "elaborated dialogue" (MacArthur & Haynes, 1995). According to Kucan and Beck (1997), the major purpose of all cognitive strategies is to encourage students to think aloud about what they have read because, as readers verbalize their thoughts, they clarify them. In that way, readers become more aware of areas that require further clarification. Typically, students with learning disabilities tend not to engage in this type of elaboration without extensive coaching, prompting, and support.

Researchers like Beck (1997) and Palincsar and Brown (1984) moved to a more flexible approach toward teaching students to be more thoughtful and reflective while they read. The steps in reciprocal teaching are broad and merely serve as generic facilitators to help teachers prompt their students to read more carefully. Students are taught to paraphrase occasionally, to predict and see if their predictions are validated by the material in the text, to ask themselves questions as they read, to stop and reread if something is unclear, and to learn to ask for help. In essence, this was an attempt to actively encourage students to think aloud about what they had read and internalize more sophisticated thinking skills as they read. As noted in the previous sections, we are still unclear as to the efficacy of teaching generic facilitators to students with learning disabilities. Only two studies address this issue (Gajria & Salvia, 1992; Labercane & Battle, 1987); results are equivocal.

A significant shift, noted by Pressley, Harris, and Marks (1992), is the move away from teaching one strategy at a time. Concomitant with this shift was a movement away from teacher modeling, guided practice, and independent practice (as in, for example, Carnine and Kinder, 1985). Instead, a shift occurred toward simultaneously teaching students multiple comprehension strategies in a looser, "more opportunistic" (Kucan & Beck, 1997, p. 271) fashion, that "built on students' existing meaning-making repertoires and was more attuned to particular contexts, purposes, and texts" (Kucan & Beck, 1997). The research studies reviewed here are unclear as to how students with learning disabilities might respond to this more natural, constructionist, and less transparent modeling of strategies.

As this research evolved, it became increasingly clear that work with peers was critical for encouragement of thinking aloud. Thinking aloud with a peer or group of peers is more natural than doing so with a teacher in a formal setting. Even in the earliest research on story grammar (Idol, 1987), heterogeneous groups were used to promote interactive dialogue about text. Often, as in the case of the Idol studies, students were also provided with facilitators to both stimulate and organize dialogue. Palincsar et al. (1991) noted how they believed that more loosely structured, collaborative group work on making sense of text was preferable to the more formulaic reciprocal teaching the primary author had used earlier. As we mentioned previously, there has been little research on reciprocal teaching with students with learning disabilities. In addition, empirical support for use of collaborative problem solving to improve comprehension abilities of students with learning disabilities is currently scant.

Recurring Problems and Issues in Comprehension Research

Even during the earliest years of research, concerns quickly emerged that text structures (e.g., story grammar, compare–contrast, problem–solution, cause–effect, and explanation) would be able to form the core of instructional interventions. In fact, some of the intervention studies we reviewed, especially for narrative text, relied on explicit teaching of text-structure knowledge to students with learning disabilities. As described in this literature review, results were promising.

Yet, it is important to note that many texts do not easily fit into one of the text structures. The situation for expository text is far more problematic. As Dimino and Kolar (1990) and Armbruster et al. (1987) have noted, many of the expository texts that students read tended to have a mixed text structure (e.g., some cause-effect, but a good deal of explanation or description or sequence). Also, the most prevalent text structures—explanation, description, and sequence—do not easily promote deep levels of analysis. In contrast, work with text structures, such as cause–effect, problem–solution, or compare–contrast, force students to review, reorganize, and integrate the information in the passage to answer the types of questions that promote deeper levels of processing. Examples of these kinds of question might be "What really is the major problem that African Americans faced in the South in the 1950s?" and "What does this passage tell me about similarities between the Serbs and the Kosavars?"

For example, Armbruster et al. (1991) noted that when teachers developed text structure maps for descriptive or explanatory passages, "They seemed to offer few major conceptual understandings or overarching principles" (p. 413). On the other hand, when the problem–solution, cause–effect, or compare–contrast text structure was the appropriate one for the passage, there was the potential to accomplish an array of important cognitive activities. Activities included separating out essential from inessential details, deciding on the most important concepts in the passage, organizing material into a coherent mental structure, and thinking through and articulating "the logical relations between the ideas in the text" (p. 411).

Another major concern was determining the best means for conveying to less proficient readers the strategies used by more proficient readers. From the onset, it seemed awkward to formally teach these extracted strategies to students in a didactic way. At best, the strategies represented crude approximations of steps used occasionally by some expert readers. Some researchers have argued that these formulations of what competent readers do were a good starting point for research but ultimately became stifling. In essence, they were too contrived.

Resnick (1987, cited in Kucan & Beck, 1997), noted that there is no evidence that proficient readers actually use the same "overt self-conscious strategies" (p. 292) that we teach to students with learning disabilities in a systematic way. Thus, she raised the interesting point that perhaps the effectiveness of the type of strategy instruction was attributable largely to the fact that cognitive strategy instruction forces students to read in a more thoughtful fashion. The specific steps may not, in Resnick's view, be so very important. What is important is that questions or steps in a strategy force students to think about what they have read and provide them with some helpful hints to guide their thinking.

The issue of exactly what transpires during strategy instruction has yet to be resolved. Understanding more precisely what transpires—and which aspects of the process actually enhance learning—is a fruitful area for subsequent research, both qualitative and quantitative. The only clear inference we feel confident in drawing from the research literature we reviewed is that, at least for students with learning disabilities, the specificity of the strategies seemed to be extremely helpful to the students.

Directions for Future Research

Other key questions for exploration include the following: How much teacher modeling is needed, as a function of text type, to ensure mastery of different strategies? What student characteristics predict the amount of modeling required? How much teacher feedback and monitoring is required, again as a function of text type, to ensure mastery of different strategies, and what student characteristics predict the required amount of teacher feedback and modeling? Does the use of multiple strategies enhance transfer effects beyond effects achieved through the use of single strategies? How does treatment duration mediate the extent to which effects are maintained?

Resnick (1987) noted that, for many strategy interventions

> Most of the training was successful in producing immediate gains in performance, but people typically ceased using the cognitive techniques they had been taught as soon as the specific conditions of training were removed. . . . They had acquired no general *habit* of using it or capacity to judge for themselves when it was useful. (p. 39)

Other directions for future research can be gleaned from a recent meta-analysis conducted by Swanson and Hoskyn (1998). They looked at all instructional intervention research in the field of learning disabilities. Using multiple regression, Swanson and Hoskyn concluded that a trio of instructional variables (out of 20 possible instructional components) explained virtually all of the common variance in outcomes. The three instructional components consistently linked to the highest effect sizes were controlling task difficulty, use of small interactive groups, and directed response questioning (e.g., teachers directing students to ask questions using a specified language or format). These three instructional variables seemed to work in concert to produce the largest degree of student learning, regardless of domain.

Two cornerstones of the reading comprehension research seem to be (a) use of small, interactive groups and (b) teaching of specific formats for students' generation of questions about the text. Yet, rarely do researchers attempt to separate out the relative impact of these two factors.

At the beginning of this era of research, Keogh (1982) noted that "the order and sequence of presentation may have important consequences" for whether or not students with learning disabilities actually acquire strategies or problem solving strategies (p. 33). To date, comprehension research has rarely addressed issues of sequencing and example selection in a systematic fashion. In part, this is because reading comprehension remains a domain that is extremely hard to systematize in terms of task difficulty (Kucan & Beck, 1997). Yet, in our view, this need not serve as a deterrent for future researchers to address these topics.

Our sense is that this may well be a productive line of research, albeit a challenging one. Swanson and Hoskyn's (1998) meta-analysis suggests that conscious attention to organization of task difficulty is likely to be linked to students' exhibiting higher levels of reading comprehension.

Resnick (1999) also stresses the importance of task difficulty. She envisioned major thrust in contemporary research as teaching students to "treat task difficulty (and thus occasional setbacks) as part of the learning challenge" (p. 39). In this sense, she mirrors the emphasis on building task persistence in students that we stress in our conceptual framework. Extensive work with peer mediation is one way to help students with learning disabilities persist in the demanding work of making sense of text. Refining our instructional approaches so that teachers have techniques and strategies for encouraging students to persist in difficult tasks remains an imprint area for future research.

Many students with learning disabilities fail to capitalize on strategies or organizational frameworks that are presented in an implicit fashion, so it is important to question and further study exactly what the long- and short-term impacts are of highly collaborative, interactive group comprehension processes on students with learning disabilities. It may be that a combination of these flexible discussions with more formalized teacher-guided instruction comprehension strategies, described in the many intervention studies reviewed in this report, is optimal.

It is possible that this combination of approaches also has a positive effect on the critical issue of task persistence, especially in the comprehension of expository text. Increasingly, theorists such as Sternberg (see Kolligian & Sternberg, 1987) and DeWitz (1997) and empirical researchers such as McKinney et al. (1993) are suggesting that the role of task persistence may be at least as important as knowledge of cognitive and metacognitive strategies in making sense out of complex expository text. Techniques or instructional arrangements, such as peer-mediated instruction, increase students' opportunities to verbalize what they are learning and to receive feedback, encouragement, or both, from peers. This may have a salutary effect on comprehension performance and students' determination to persevere in the face of a difficult task. So, too, the various scaffolds and organizers described in the preceding sections may help students persevere in the sometimes arduous, often nebulous task of text comprehension. These scaffolds and organizers allow students who see the big picture to see how the pieces fit together, and they may simply see that there is an end in sight.

Another issue currently confronting the field relates to the relative benefits and drawbacks of using peers to teach or foster comprehension strategies (D. Fuchs et al., 1997; Vadasy, Jenkins, Antil, Phillips, & Pool, 1997). A potential limitation of using peers is that they may not have the verbal facility to adequately explain what they do to construct (i.e., comprehend) the meaning of what they read. However, it is also possible that one advantage of peer instruction is that students would more easily understand the language of their peers than the more formal language of adults.

Still, it is important to keep in mind an observation made by Brown and Palincsar (1989, cited in Kucan & Beck, 1997), which emphasizes that conceptualizations stressing the social aspect of learning and collaborative learning may be seductive, but questions arise regarding the extent to which "social collaborations lead to independent competence"(p. 397). In other words, the extent to which each individual student in the collaborative group is better able to comprehend text when reading independently remains unclear.

Another important question is whether comprehension instruction should ever be broken down into a series of steps. Some prominent comprehension researchers (e.g., Beck, 1997) argue that a more fluid discussion of text, whereby the teacher models the wide array of strategies important for making sense of text, is a potentially better method than using direct or explicit instruction in well-defined strategies. But these recommendations have not been made in the context of best practice for students with learning disabilities. After more research has been done, we may conclude that these recommendations are appropriate for many or even most children; yet, the special needs of students with learning disabilities may demand a more explicit instructional focus. Indeed, the intervention studies reviewed in the article suggest that for this population, more structured, explicit instruction in well-defined strategies will be desirable.

Clearly, a rich and ambitious research program will give practitioners needed guidance about how to further improve the comprehension of expository and narrative text among students with learning disabilities. Research is also needed to determine the nature of professional development strategies that support teachers in their implementation of these relatively complex reading comprehension interventions.

Assessment of transfer effects is a critical area for further research. We need more information about how often and how long treatments must be implemented to promote transfer and routine use—either through students' continued conscious use of strategies or by students' internalizing their use. In this regard, the year-long interventions of contemporary researchers (Englert & Tarrant, 1995; D. Fuchs et al., 1997) seem to be a step in the right direction.

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Note

[1]A substantial body of research literature exists on methods for the adaptation or modification of texts for students with learning disabilities. This literature describes how certain characteristics of text contribute to comprehension difficulties and how text can be modified for easier comprehension. For those interested in this body of literature, see, for example, Mastropieri and colleagues (1996a) and L. Fuchs (in Gersten, Williams, Fuchs, & Baker, 1998).

The present review, by contrast, is restricted to the examination of studies that attempt to teach students with learning disabilities how to develop strategies that assist in their comprehension of the text they read. Thus, we exclude the studies of text adaptations and modifications.

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