Effective Strategies for Developing Reading Comprehension

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Abstract This chapter focuses on instructional strategies for improving reading comprehension of students with learning disabilities (LD). It discusses the nature of reading comprehension and highlights comprehension difficulties experienced by students with LD. This discussion is followed by a selective overview of the research on cognitive and metacognitive strategies, with a focus on components of effective instruction gleaned from the research on reading comprehension.

Keywords Reading comprehension • Reading strategies • Cognitive strategy instruction • Metacognition • Learning disabilities

1 Effective Strategies for Developing Reading Comprehension

Reading comprehension has been defined as "the process of simultaneously extracting and constructing meaning through interaction and involvement with written language" (Shanahan et al., 2010, p. 5). Considered as the "essence of reading" (Durkin, 1993), reading comprehension is a complex task that involves processing at multiple levels. To comprehend text, readers must interact with the words, sentences, paragraphs, and larger discourse units (e.g., whole text). They must do more than simply interpret what is explicitly stated in the text. In order to learn in the content areas and achieve academic success, it is critical that students be purposeful in their reading. Purposeful reading entails planning, selecting, and using appropriate strategies to effectively engage with the text, connecting prior knowledge to new information, and simultaneously monitoring understanding.

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Many students with LD consistently experience problems in comprehending text. Although the group of students with difficulties in reading comprehension is diverse, some general characteristics of this group include problems in identifying main ideas and supporting details, asking questions, paraphrasing text, predicting information, drawing inferences, and recalling textual ideas (Gajria, Jitendra, Sood, & Sacks, 2007; Gersten, Fuchs, Williams, & Baker, 2001). Creating a summary or gist of the main ideas of a text is also difficult for many students as they struggle to differentiate important ideas from unimportant details and have trouble ignoring extraneous information (Gajria & Salvia, 1992). Moreover, they experience difficulty in understanding expository text patterns and using text structure knowledge to guide encoding and retrieval of academic concepts (Williams & Pao, 2013).

These challenges are not necessarily rooted in discrepant language experiences or decoding skills that are not automatic, but may be influenced by insufficient prior knowledge. Students may lack the requisite schema or background knowledge to draw inferences essential to comprehending a text (Kendeou & van den Broek, 2007), or in some cases may fail to activate it despite having the relevant schema (Elbro & Buch-Iversen, 2013). Working memory capacity is also critical for reading comprehension as it holds new information and allows the reader to connect it with prior knowledge to construct a representation of the text and to revise previous understanding of the text based on new readings (Swanson, Howard, & Sáez, 2007). Additionally, students with LD tend to be passive in their approach to reading. They either lack reading comprehension strategies or do not spontaneously deploy them to access information in textual material (Torgesen, 1982). Typically, these students do not go back and reread confusing sections of text or monitor and evaluate their ongoing understanding of text. Students' inability to flexibly apply cognitive and metacognitive strategies used by proficient readers on a reading task places limits on their reading comprehension and ability to learn from both narrative and expository texts.

This chapter focuses on the topic of reading comprehension and effective strategies for assisting students with LD become proficient readers. Specifically, it examines the research base on cognitive and metacognitive strategies, with a focus on components of effective instruction. This chapter is not an exhaustive review of effective practices for promoting reading comprehension in students with LD. Although findings from other studies of reading comprehension approaches (e.g., content enhancement) may add to this research base, the findings from studies in this chapter do highlight ways to help students with LD develop reading comprehension skills.

1.1 Cognitive and Metacognitive Strategies

Cognitive strategies are cognitive processes that the learner intentionally performs to influence learning and cognition (Mayer, 2001). These mental routines or procedures serve to organize and store incoming information in memory and facilitate

performance on specific cognitive tasks, such as solving a problem in mathematics or making sense of what is being read. Rosenshine (1995) defines a cognitive strategy as "a heuristic or guide that serves to support or facilitate the learner as she or he develops the internal procedures that enable them to perform the higher level operations [such as reading comprehension]" (p. 266). Studies have established the efficacy of instruction in reading strategies, such as self-questioning, activating prior knowledge, predicting, or summarizing, for promoting reading comprehension and content area learning in students with learning disabilities (see Gajria et al., 2007; Gersten et al., 2001). Specifically, these strategies help "readers enhance their understanding, overcome difficulties in comprehending text, and compensate for weak or imperfect knowledge related to the text" (Shanahan et al., 2010, p. 10).

Cognitive strategy instruction also involves a focus on metacognitive skills, an awareness of one's own cognitive processes and how to regulate them (Swanson & Hoskyn, 1998). Metacognitive skills, including self-monitoring, help students evaluate the difficulty level of a learning task and select, use, and monitor their ongoing performance. Essential for competent reading, comprehension monitoring directs the readers' cognitive resources as they strive to make sense of incoming information (Wagoner, 1983) and helps them evaluate the effectiveness of the reading strategy, and make changes when they detect a breakdown in comprehension. Unfortunately, students with LD often have trouble thinking about whether they understand what they are reading and do not know how and when to use reading strategies. Therefore, instruction in metacognitive strategies is an important consideration for students with LD to support the independent use of reading comprehension strategies.

1.2   Cognitive Strategy Instruction

An evidence-based approach to comprehension instruction is centered on teaching students the cognitive strategies used by proficient readers (Jitendra, Burgess, & Gajria, 2011). Within the framework of reading, the focus of cognitive strategy instruction is to improve how students approach and engage with a text so that they can become more active, focused, deliberate, independent, and self-regulated in processing information from texts. Early research focused on instruction in a single cognitive strategy to promote reading comprehension. Later, researchers embedded a metacognitive component such as self- monitoring with a specific cognitive strategy and also developed multicomponent reading packages (e.g., reciprocal teaching) that integrated the use of several cognitive strategies. The goal of cognitive strategy instruction, regardless of instruction in single or multiple strategies, is on 'how to learn' rather than 'what to learn.' The underlying premise is that students, including students with LD, can be taught cognitive strategies proven effective for increasing reading comprehension.

1.3   Single Strategy Studies

Several single strategy interventions to promote reading comprehension in students with LD have been studied, including the use of text structure, main idea instruction, self-questioning, cognitive mapping, and summarizing.

Text Structure   Proficient readers are knowledgeable about how a text is organized and can use the underlying structure of the text to understand, learn, organize, and remember what they read. Knowledge and use of text structure is critical for comprehending and remembering content, as it can guide students in extracting and constructing meaning while reading (Shanahan et al., 2010). Instruction that focuses on text structure should help students differentiate between the two genres of text structure, narrative and expository. Narrative texts, such as historical fiction, fables, and autobiographies, are typically stories that are structured by a temporal sequence of events. In contrast, expository texts, such as content area textbooks, news articles, and speeches, communicate information on a topic and reflect organization of abstract thought based on logical relations.

Narrative texts are generally easier to understand than expository texts as the content is more familiar to students and they have a single organizational structure commonly referred to as story grammar or story schema. Typically, story grammar elements include the setting, characters, events, goal, problem, solution or resolution, and a theme (Baumann & Bergeron, 1993; Morrow, 1996). In comparison with their nondisabled peers, students with LD do not have a good grasp of story grammar elements and often have trouble recalling elements of a story, particularly the theme, which is abstract and rarely stated explicitly in the story (Dimino, Gersten, Carnine, & Blake, 1990). Interventions focused on teaching story grammar promote students' reading comprehension and recall as they help students understand *where*, *who*, *what*, *when and why* in a story (Trabasso & Bouchard, 2002).

In a landmark study conducted by Idol and Croll (1987), five elementary students with LD were taught to use a story map, a visual organizer with story elements as headings, while reading. A basic assumption was that a link between the story's organizational structure and students' knowledge structure would promote comprehension. The positive results suggest that "mapping of story components is an effective way to build structural schemata" (p. 225). Building on Idol and Croll's work, Gardill and Jitendra (1999) used a multiple baseline design across participants to teach story elements to six middle school students with LD. Instructional procedures included teacher modelling, guided practice with feedback, and independent practice. Results indicated that story map instruction improved comprehension, students maintained the strategy, and generalized the strategy to novel passages.

A body of research provides evidence that story maps can be used successfully to teach reading comprehension to elementary (e.g., Boulineau, Fore, Hagan-Burke, & Burke, 2004; Stagliano & Boon, 2009) and secondary school students (Onachukwu, Boon, Fore, & Bender, 2007). Dimino et al. (1990) developed an instructional program to help secondary students learn the concept of a theme and

identify the theme in complex stories. They directly taught an interactive comprehension strategy based on story grammar that provided opportunities for secondary students, including students with LD, to "clarify and discuss important elements of the story as they read" (p. 29). Results indicated significant posttest differences in favor of the story grammar instruction group related to performance on story grammar, factual, and theme questions. As results were not disaggregated for students with LD, the success of this intervention for students with LD cannot be confirmed. However, using a similar approach, Gurney, Gersten, Dimino, and Carnine (1990) provided evidence that comprehension of important elements in literature anthologies, including the theme, can be improved as a function of story grammar instruction for high school students with LD.

Several studies have also shown that when story grammar interventions integrated metacognitive strategies (e.g., recognizing when and how to apply the story grammar strategy, asking questions about story elements), students' reading comprehension improved (Carnine & Kinder, 1985; Faggella-Luby, Schumaker, & Deschler, 2007; Griffey, Zigmond, & Leinhart, 1988; Therrien, Wickstrom, & Jones, 2006). Carnine and Kinder taught elementary students with LD to construct generic story grammar questions to address the characters, events, and resolution of the story. Results indicated that directly teaching students how to ask questions about story elements improved their comprehension. Griffey et al. documented that while story grammar intervention alone or used along with a self-monitoring strategy showed modest pretest to posttest gains for elementary students with LD, it did not result in better comprehension than teaching students to ask questions about the text. Perhaps, the four instructional sessions in this study may not have been sufficient for students with LD, who often need more time to realize gains in reading comprehension.

More recently, researchers have documented the effectiveness of combined use of story grammar instruction and question generation (Therrien, Wickstrom, Jones, 2006) with self-questioning before reading (Faggella-Luby et al., 2007) for increasing reading comprehension performance of students with LD. Therrien et al. successfully taught students with LD (grades 4 through 8) to answer factual and inferential questions using cue cards with generic story structure questions. Faggella-Luby et al. established the efficacy of an Embedded Story Structure (ESS) Routine, an intervention that incorporated student self-questioning, story structure analysis, and summarizing, with high school students with LD. The success of the intervention in improving student story structure knowledge and comprehension may be attributed not only to the careful design of the intervention, but also the intensive instruction (17 h) that students received.

Together, the above studies provide strong evidence that, across grade levels, directly teaching students with LD story grammar can highlight important relations, which, in turn, facilitates understanding of the story. Also, adding a metacognitive component to story grammar instruction positively influences comprehension.

Research has also addressed the effect of instruction in expository text structure to promote conceptual understanding of informational texts for students with LD. Unlike narrative texts that follow one structural pattern, expository or

informational texts have a variety of underlying structures, compare-contrast, sequence, cause-effect, and description. Expository texts entail a variety of text structures, which deal with abstract, unfamiliar information and are often challenging for students with LD who experience difficulties in understanding and learning information from these texts. Research has shown, however, that students' comprehension and recall of informational text are both positively linked to instruction in specific expository structures.

A study by Smith and Friend (1986) investigated the effect of text structure instruction on the comprehension and recall of high school students with LD. Students were taught to recognize and use five different text structures (time-order, problem/solution, comparison, description, and cause-effect) to guide their comprehension of expository prose. Results indicated that the intervention group statistically outperformed the control group on both structure recognition items and recall of main ideas. In another study, Bakken, Mastropieri, and Scruggs (1997) taught eighth-grade students with LD to identify three kinds of text structures (i.e., main idea, list, and order) in science passages and apply structure specific strategies to study passages. Compared to students in paragraph restatement and traditional instruction groups, students in the text structure based strategy group scored higher on recall measures and showed better transfer to untrained social studies passages. More recently, instruction in main idea and compare – contrast text structure significantly increased comprehension of science text passages for postsecondary students with LD (Gaddy, Bakken, & Fulk, 2008). In general, teaching genre specific text strategies favorably impacts students' comprehension and recall of text information.

Finding the Main Idea The ability to identify the main idea or most important idea unit in text is central to reading comprehension. According to Williams (1988), finding the main idea is "the basis for being able to draw appropriate inferences from the text, to study effectively, and to read critically" (p. 2). It is important to note that the nature of the main idea differs between narrative and expository text types (see Baumann, 1986; Moore, Cunningham, & Rudisill, 1983; Pearson & Johnson, 1978). In narrative texts, the reader has to discern the theme of a story from the description of events and their temporal sequence, whereas in expository text the reader must develop a generalization or a thesis based on the logical relationship of ideas about a topic. As expository prose has several different genres, including description, compare-contrast, sequence, cause-effect, and problem-solution, the main idea may be defined by a specific genre (Williams, 1988, 2004).

Students with LD frequently struggle with identifying the main idea in reading passages, and the challenge is more pronounced with content area texts. To compound this situation, the main idea is not always explicitly stated in the text, and in such cases, readers must generate a statement to represent the main ideas. Several researchers have investigated instructional strategies to help students with LD identify or construct the main idea of texts. These investigations have typically included the direct instruction paradigm in isolation or in combination with metacognitive skills such as self-questioning or self-monitoring procedures. In an early

investigation, Jenkins, Heliotis, Stein, and Haynes (1987) taught elementary school students with LD to restate the most important idea for each paragraph in a narrative. Students were taught to ask themselves two questions, "who" the paragraph was about and "what's happening," and to briefly restate the gist of the story in their own words. Results supported the usefulness of writing restatements of important ideas to improve reading comprehension.

Other studies that focused on a paraphrasing or restatement strategy combined with self-questioning procedures also produced similar results. Schumaker, Denton, and Deshler (1994) developed a paraphrasing strategy for use with expository texts. Students learned to use the acronym RAP to follow three steps to determine the main idea in paragraphs, **R**ead a paragraph, **A**sk what are the main idea and details of the paragraph, and **P**ut the information into your own words. Ellis and Graves (1990) documented positive results for instruction in the paraphrasing strategy on reading comprehension skills of upper elementary and middle school (grades 5–7) students with LD.

Wong and Jones (1982) used a self-questioning approach to teach students with LD in grades 8 and 9 to interact with the text in order to create "a paraphrased version of the main idea" (p. 231). The training resulted in increased awareness of important textual units and performance on passage comprehension tests. In the Bakken et al. (1997) study, eighth-grade students who were taught to apply a paragraph restatement strategy to science passages involving three types of text structures (main idea, list, order) improved their performance compared to students in a traditional instruction group on immediate and delayed recall measures, as well as transferred the strategy to social studies.

Another strand of research on main idea instruction combined principles of direct instruction with self-monitoring procedures with considerable success. Graves (1986) compared two approaches to main idea instruction – direct instruction and direct instruction plus self- monitoring. Students with LD in grades 5 through 8 were taught a rule to find the main idea in expository passages. Students in the combined condition, direct instruction and self–monitoring, were taught to question themselves on the main idea and to check their understanding on a self-monitoring card. Results of the study indicated that both groups showed improvement in comprehension performance as compared to a control condition. In addition, the self-monitoring component was found to have added value regarding increased comprehension of main ideas. In a related study, Graves and Levin (1989) found that self-monitoring was more effective than a mnemonic condition for recognizing main ideas in texts. Jitendra, Cole, Hoppes, and Wilson (1998) also documented the benefits of direct instruction and self-monitoring for main idea identification in passages for three grade 6 students with LD.

Essentially, research supports principles of direct instruction combined with self-questioning or self-monitoring as tools for main idea instruction and increasing comprehension skills. Students with LD in grades 5 through 9 saw improved outcomes on comprehension measures on both narrative and expository texts as a result of main idea instruction. Furthermore, main idea instruction resulted in maintenance and transfer in some studies.

Cognitive Mapping Students with LD typically experience difficulties in identifying main ideas and important details in a text, and understanding their interrelationships, a skill essential for making meaning. Cognitive maps make "use of lines, arrows, and spatial arrangements to describe text content, structure, and key conceptual relationships" (Darch & Eaves, 1986, p. 310), thereby making implicitly stated relationships explicit and difficult to understand information more memorable. While several researchers have successfully used teacher constructed cognitive maps and documented gains on reading comprehension for students with LD (Bos & Anders, 1990; Darch & Eaves, 1986), research on teaching students to independently generate cognitive maps is limited.

Boyle (1996) examined the effects of instruction in a cognitive mapping strategy on the literal and inferential comprehension skills of middle school students with LD and those with mild cognitive disabilities. Students were taught to independently construct cognitive maps for expository passages using a mnemonic that prompted them to identify and link the main ideas with the supporting details. Results indicated that students trained in generating and using cognitive maps during reading showed improvements in both literal and inferential comprehension skills but failed to transfer the strategy to a standardized reading comprehension assessment. In a related study, Boyle (2000) taught high school students with LD and mild cognitive disabilities to construct a Venn diagram, a specific type of cognitive map most applicable to compare-contrast main ideas in text. Results indicated that students improved on measures of literal comprehension and relational comprehension more than they improved on inferential comprehension. It appears that a lack of details and explicit relationships in the Venn diagrams could have contributed to weak performance in inferential comprehension.

Questioning This reading strategy promotes comprehension by teaching students how to activate prior knowledge, focus attention on important information, summarize key points, and monitor their ongoing understanding of the text by asking themselves a series of questions before, during, or after reading a passage. When students ask questions about the material they are reading, they interact more closely with the text and are more engaged in the reading. While teacher generated questions and textbook questions are certainly critical in developing students' understanding of the material across a wide range of learners, students can also be taught self-questioning as a cognitive strategy to promote deeper processing of the information (Englert, 2009; Rosenshine, Meister, & Chapman, 1996).

Wong and Jones (1982) examined the effects of a questioning strategy that taught students to generate questions about the main ideas and answer these questions as they interacted with the text. Results indicated that compared to a traditional instruction group, eighth- and ninth-grade students with LD trained in self-questioning significantly improved their ability to generate text based questions and comprehension performance. In a different approach to questioning, Simmonds (1992) examined the effects of the question-answer relationship (QAR) strategy on text comprehension of students with LD in grades 1 through 9. Students who were taught

the QAR strategy learned to differentiate between three kinds of comprehension questions, 'Right There' (literal question), 'Think and Search' (text implicit – text-based inference question) and 'On My Own' (script implicit – prior-knowledge-based inference question). After intervention, QAR strategy students outperformed their peers on a social studies comprehension test. Taking a different approach to questioning, Mastropieri et al. (1996) examined the effect of elaborative interrogation on comprehension of science content. Middle school students with LD were taught to reason through the material in science passages, ask the question 'why does that make sense' about each science fact, and generate a suitable explanation. When compared to a control group that was directed to remember the information, students trained in reasoning skills produced more correct explanations for the facts but did not recall more information. The authors suggested that the weak effects could be attributed to the short training period and more instruction may be essential to realize intended effects.

Berkley, Marshak, Mastropieri, and Scruggs (2011) examined the effects of a self-questioning strategy for three 7th-grade inclusive classrooms that included students with disabilities, five with LD. Students were explicitly taught to use headings and subheadings to create comprehension questions and to answer these questions for a grade level social studies text. Results indicated that students in the self-questioning strategy group scored higher than the traditional practice group in comprehension as assessed by both multiple choice and essay tests of the social studies content. While research on self-questioning as a cognitive strategy for promoting reading comprehension appears promising for students with LD, most researchers have focused on teaching students at the middle or high school grade levels. Lately, researchers were successful in extending the research to upper elementary school students (Rouse, Alber-Morgan, Cullen, & Sawyer, 2014). Two 5th graders with LD were taught to generate questions for expository reading passages using a prompt fading procedure. Initially, students answered text embedded questions, which were systematically faded and replaced by a prompt for students to generate their own questions. Results showed positive effects of self-questioning on comprehension. Clearly, research evidence supports explicitly teaching students to monitor their understanding of the material by asking and answering questions while they are reading.

Summarization The National Reading Panel (2000) identified summarization as an instructional approach with a solid scientific basis for improving reading comprehension. It helps students to concentrate on what is important, understand relationships between ideas, focus on text structure, extract main ideas and supporting details from texts, and condense the information that needs to be remembered. Summarizing is a complex skill, different from paraphrasing or restating information; it requires students to develop a concise account or gist of the most important points in the text. To construct a summary, students must draw upon their prior knowledge to perform a series of cognitive operations on the information that is read; evaluate to determine whether the information is important enough to include

in a summary; condense to combine important idea units; and transform to present the gist in 'their own words.' As such, summarization is an essential strategy for comprehension and studying, and is often a crucial component of strategy packages (e.g., reciprocal teaching, Brown & Palincsar, 1982; collaborative strategic reading, Klingner, Vaughn, Arguelles, Hughes, & Leftwich, 2004).

Typically, poor readers and students with LD experience problems in summarizing as they are unable to determine the relative importance of different idea units in text and make decisions about what to include on a sentence-by-sentence basis. Additionally, they struggle to put the information in their own words. Research has examined the value of summarizing as a comprehension strategy, with a focus on making students aware of the highest level of information or main ideas in a text as well as details that support the main ideas, because both are critical to remember for learning across the content areas.

Gajria and Salvia (1992) combined a direct instruction approach with mastery learning to teach students with LD in grades 6 through 9 to develop a summary of the main ideas of an expository passage by applying the five rules proposed by Brown and Day (1983) – reduce lists, select topic sentences, construct topic sentences, delete redundancies, and delete unimportant information. After students mastered each rule in isolation, they were taught how to combine the rules. They began with guided practice and gradually assumed increased autonomy in applying the rules in order to summarize passages. Instruction results were positive; students in the treatment group outperformed students in the comparison condition on factual and summarization questions, maintained the skill, and showed transfer of performance on a standardized reading assessment. Similarly, Nelson, Smith, and Dodd (1992) examined the effects of explicit instruction in the five rules of summarization in conjunction with a summary writing guide for five students with LD in grades 4 through 8. Study findings supported the use of explicit instruction on both quality of student generated summaries and performance on comprehension questions.

Using a different approach, Malone and Mastropieri (1992) examined the differential effects of combining self-monitoring with summarization. Middle school students with LD in the summarization training group were taught to construct a summary sentence for each paragraph in narrative passages by asking questions about the subject of each paragraph and the related action. In addition to summarizing information, students in the combined group were taught to use a self-monitoring card to check application of the strategy. Students in both intervention groups, summarization and summarization with self-monitoring, outperformed students in the self study group on reading comprehension measures. Students also trained in the self-monitoring component successfully transferred the strategy from narrative to social studies passages. Similarly, working with middle school students with LD, Jitendra, Hoppes, and Xin (2000) assessed the effectiveness of combining self-monitoring with a summarization strategy. Students were taught to identify or generate main idea sentences that summarized the passage and to use a self-monitoring card to cue the strategy. Results indicated a positive effect on comprehension

performance, and these effects maintained over 6 weeks. Transfer effects were less robust, and were documented on selection items but not on production responses. The authors attributed this to the higher readability level and more implicit idea units in the transfer passages as compared to the training passages.

The findings of summarization training studies point to the importance of explicit instruction in summarization, preferably with a self-monitoring component. Summarization instruction enhanced students' ability to effectively summarize both narrative and expository text and resulted in improved comprehension and recall, with robust maintenance and transfer effects.

In summary, explicit instruction in cognitive strategies, such as using text structure, finding the main idea, self-questioning, cognitive mapping, and summarization techniques, leads to significant improvement in students' comprehension of both narrative and expository texts, across different grade levels. In addition, combining a self-monitoring component with a single cognitive strategy, such as self-questioning or summarization, has a powerful effect on promoting comprehension. The next section discusses multiple strategy studies, with a focus on the integrated use of several strategies to enhance comprehension.

Multiple Strategy Studies   Research has focused on developing reading strategies before, during, and after reading to support understanding of text. The focus on higher-level reading and thinking skills in the different phases of reading has led to the importance of instruction in multiple strategies. Although learning multiple strategies might seem complicated initially, such instruction "familiarizes students with using the strategies together from the very beginning, providing a more authentic, strategic reading experience" (Shanahan et al., 2010, p. 13). Multiple-strategy instruction assists students as they coordinate the use of a repertoire of strategies as they read the text, ask questions, draw connections, find main ideas, clarify meaning, reread, and paraphrase or summarize key information (see Jitendra et al., 2011). Based on research with students with LD, reciprocal teaching (RT) and its variants, as well as verbal rehearsal strategies such as the SQ3R (Survey, Question, Read, Recite, Review) and its adaptations, are key examples of multiple-strategy formats that combine various strategies.

Reciprocal Teaching   Reciprocal teaching (RT), which is based on Vygotsky's (1978) notions about social construction of knowledge and the importance of interactive dialogue for learning, was developed by Palincsar and Brown (1984) for children with adequate decoding proficiency. The key features of RT include: (a) four comprehension-fostering and comprehension-monitoring strategies (i.e., prediction, clarification, question generation, and summarization) to comprehend narrative and informational texts, (b) interactive teacher-student dialogue in applying the four strategies and (c) scaffolded instruction in which initial teacher modeling (expert scaffolding) is replaced by students gradually assuming responsibility in leading a discussion of the text and understanding why, when, and where the four strategies are applied to understand new text. A seminal study by Palincsar and Brown provided evidence of the effectiveness of RT in improving the reading

comprehension of junior high-school students with comprehension problems, as well as retaining the effects 8 weeks following the end of the 20-day intervention. Results also demonstrated generalization to a classroom setting, with students meeting or surpassing the average performance of their peers without comprehension problems.

Although there is a body of research suggesting the benefits of RT for elementary through postsecondary students with reading comprehension problems in different settings and geographic areas (e.g., Alfassi, 1998; Bruce & Chan, 1991; Hart & Speece, 1998; Le Fevre, Moore, & Wilkinson, 2003; Lovett et al., 1996; Lysynchuk, Pressley, & Vye, 1990; Palinscar, Brown, & Martin, 1987; Takala, 2006), we identified only two published studies of reciprocal teaching for students with LD. The early investigation of RT by Labercane and Battle (1987) was conducted with ten middle school students with LD. Researchers supplemented the question generation strategy in the RT framework with Raphael's (1982) QAR (Question-Answer-Response) procedure, an effective strategy for both answering and generating questions. During the first 4 weeks, RT was implemented with the ten participants in the study in a whole group arrangement. For the remaining 10 weeks, the class was divided into two small groups to better foster interaction among group members. Results indicated no significant differences between students in the RT condition and those who did not receive such instruction on the Gates-MacGinite standardized reading subtest. The ineffectiveness of RT may be explained by the less than ideal peer interactions in the groups since all students in the study experienced significant reading problems (functioning at least three grades below grade level), as well as the use of a standardized reading comprehension test that placed considerable demands on students with LD (e.g., require different strategies than the ones in RT) and was less sensitive to the intervention effects.

Lederer (2000) worked with upper elementary students (grades 4 through 6), including students with LD, in mixed-ability groups and taught them to apply the strategies in RT to comprehend social studies texts. Results indicated that students who received the strategy instruction outperformed their counterparts in the control condition on answering short questions, generating questions, and composing summaries. Unfortunately, Lederer did not disaggregate the data for students with LD. As such, the extent to which students with LD were responsive to RT intervention conducted in heterogeneous classrooms is not known.

In addition to the studies that used conventional RT, researchers have developed variations of RT for use with students with LD. An adaptation of RT that has received much attention is collaborative strategic reading (CSR), which has "combined modified reciprocal teaching components … and cooperative learning strategies" (Klingner, Boardman, Eppolito, & Schonewise, 2012, p. 55). The modified RT components include four strategies – preview, click and clunk, get the gist, and wrap up. Students are taught to apply these strategies in different phases of reading – before reading (preview the text by connecting the topic with what is already known and predict what will be learned about the topic), during reading (monitor comprehension and use fix-up strategies to decipher unknown words or phrases [referred to

as the *click and clunk strategy*] and identify the most important ideas in the text to get the gist), and after reading (*wrap up* – generate questions and review key ideas learned).

Several quasi-experimental and experimental studies have been conducted to improve grade-level expository text comprehension of students with LD, struggling readers, and English language learners. In a study of fourth-grade students with LD (Klingner et al., 2004), researchers trained teachers in the treatment condition to implement CSR instruction using social studies texts. Compared to students in the control condition who received standard school based instruction, students in the CSR classrooms showed superior performance on reading comprehension measures. In a study of sixth- and eighth-grade students with LD, Kim et al. (2006) implemented a computer adapted CSR intervention. Results showed that students in the CSR condition performed higher on reading comprehension measures than students in the control group. The study by Bryant et al. (2000) incorporated CSR as one of several reading comprehension interventions and investigated its effects for sixth-grade students, including students with LD and English language learners. Although the researchers reported gains on word identification, there was no improvement in reading comprehension scores.

Developed by Englert and Marriage (1991), another adaptation of RT involves explicitly teaching text structure (e.g., description, compare-contrast) to students with LD within the framework of RT. In their work with upper elementary students with LD, researchers used the RT model to combine text structure mapping with instruction in an integrated set of comprehension strategies cued by the acronym, "POSSE" (i.e., Predict, Organize, Search, Summarize, and Evaluate). Similar to CSR, students apply these strategies in different phases of reading. Before reading strategies include predicting (i.e., activating background knowledge), and organizing ideas using the text structure. During reading, students learn to apply the remaining strategies to search for and summarize main ideas based on text structure and evaluate comprehension. Researchers developed strategy sheets and cue cards to scaffold student learning. The use of strategy sheets makes "visible to students both the strategies and the text structures for performing the reading process" (p. 126) and cue cards serve "to prompt the self-talk and inner language related to a particular reading strategy, such as predicting, organizing, searching, summarizing, and evaluating" (p. 127). Results showed that the students in the intervention condition outperformed students who received traditional instruction in the same text on several measures of comprehension, total free recall of ideas, recall of main ideas, overall organization of recalls, and strategy knowledge.

SQ3R Developed by Robinson (1941), SQ3R prepares students to read strategically to promote reading comprehension and recall. The use of verbal rehearsal strategies (i.e., **S**urvey headings and subheadings to gain an overview of the reading passage; **Q**uestion, change headings and subheadings to questions to set a purpose for reading; **R**ead the passage/text to answer questions; **R**ecite the important information and write brief notes about key ideas; **R**eview the main points and try to recall them, checking to see if correct), a key component of SQ3R, helps students

organize, elaborate, and rehearse information from expository text. Initially, the teacher describes and models each strategy, followed by students rehearsing orally and practicing implementing each strategy using selected texts; finally, the teacher provides feedback to students.

In one of the earliest studies on the effectiveness of SQ3R, Adams, Carnine, and Gersten (1982) explicitly taught typically achieving fifth graders to: (1) preview the 800 word passage in social studies text by reading headings and subheadings, (2) recite the subheadings, (3) ask questions based on subheadings, (4) read to find important details under the subheading, (5) reread the subheading and recite important details, and (6) after steps 2–5 are repeated for each subheading, reread the subheading and recite important details. Compared to students who were instructed to independently study the same materials and a group that received no instruction, students in the instructed group did significantly better on factual short answer comprehension tests and maintained their performance 10 days after training.

Evidence from a study by Alexander (1985), in which three 11-year old students with LD with grade level decoding skills but poor comprehension were taught to apply the study strategies package developed by Adams et al. (1982), suggests that variability in the population and materials may play a role in whether effects from the early study replicate. Although the instructional materials differed to include 200–word third-grade level expository passages modified to contain suitable subheadings, results showed an increase in students' oral retelling of the passage, with the effect maintained over time.

Across a series of three studies, McCormick and Cooper (1991) taught secondary students with LD diagnosed with reading deficits to apply SQ3R to history texts. Students were prompted to survey the text for clues, ask text-related questions, read the text to find answers, paraphrase (recite) the answers found in the text, and review the information in the text. Results indicated that SQ3R did not influence literal comprehension outcome as assessed by oral retells. However, consistent with previous research (Adams et al., 1982; Alexander, 1985), the percentages of retelling were strongly related to the length of the text read, with higher percentages of recall found for shorter than longer passages.

A successful adaptation of the SQ3R is the Multipass strategy (Schumaker, Deshler, Alley, Warner, & Denton, 1982). This multicomponent intervention requires three passes of the material (i.e., survey, size-up, and sort-out). Students are taught to familiarize themselves with the main ideas and organization of the chapter by focusing on subheadings, illustrations, and reading the chapter summary in the "survey" pass. They learn to focus on end of the chapter questions to determine what is important, and then skim the text to find answers without completely reading the text (size up). Last, students test themselves on questions and other important material (sort-out). Schumaker et al. reported improved reading comprehension of instructional and grade level expository texts for secondary students with LD when instruction in Multipass strategy embedded principles of direct instruction, including teacher modeling, verbal rehearsal of strategy, and guided practice in controlled and grade level materials. In sum, the findings from multiple cognitive

strategy studies support and reconfirm the effectiveness of explicit and strategic practices to help students with LD become more proficient readers.

2 Conclusion

Regardless of the nature of reading comprehension difficulties, the cognitive and metacognitive strategies described here and the instructional components we have highlighted illustrate practices that can improve reading comprehension skills of students with LD. The effectiveness of single strategy (e.g., using text structure, finding the main idea, cognitive mapping, questioning, summarizing) or multiple strategy instruction (e.g., reciprocal teaching, SQ3R) depends on the careful selection of instructional level texts and explicit use of the procedures to address the learning problems of students with LD. Ensuring that students with LD transition from being passive readers to engaging in reading processes demonstrated by strategic readers requires providing teacher-directed supports and instruction regardless of students' proficiency in using the strategies.

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