First published 2009
by Routledge
270 Madison Ave, New York, NY 10016
Simultaneously published in the UK
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN
Routledge is an imprint of the Taylor & Francis Group, an informa business
To purchase your own copy of this or any of Taylor & Francis or Routledge’s
collection of thousands of eBooks please go to www.eBookstore.tandf.co.uk.
© 2009 Taylor & Francis
All rights reserved. No part of this book may be reprinted or
reproduced or utilized in any form or by any electronic,
mechanical, or other means, now known or hereafter
invented, including photocopying and recording, or in any
information storage or retrieval system, without permission in
writing from the publishers.
Trademark Notice: Product or corporate names may be
trademarks or registered trademarks, and are used only for
identification and explanation without intent to infringe.
Library of Congress Cataloging in Publication Data
Handbook of metacognition in education/edited by Douglas J. Hacker, John
Dunlosky, Arthur C. Graesser.
p. cm.—(The educational psychology series)
1. Cognitive learning—Handbooks, manuals, etc. 2. Metacognition—
Handbooks, manuals, etc. I. Hacker, Douglas J. II. Dunlosky, John.
III. Graesser, Arthur C.
LB1067.H28 2009
370.15’2—dc22
2008052651

ISBN 10: 0–8058–6353–2 (hbk)
ISBN 10: 0–8058–6354–0 (pbk)

Learning to read with understanding is the most important achievement in a young student’s life. Unfortunately, many students are unable to comprehend texts, even though they can decode them fluently. Consequently, teachers, researchers, and other educators have begun focusing on early comprehension instruction. This chapter addresses the role of metacognition in teaching reading comprehension to primary students. It includes a review of studies on the development of metacognition and a review of instruction designed to develop metacognition both in young children and in teachers. We begin with a short discussion of some of the basic concepts relevant to the study of comprehension and comprehension instruction. Variation in the way these concepts are defined sometimes leads to confusion.

The RAND Study Reading Group defined reading comprehension as the extraction and construction of information through the involvement and interaction with a text (RAND Study Reading Group, 2002). Successful comprehension involves sifting through a text to identify its main point and often going beyond that to critically evaluate or apply what has been understood. It consists of many components, such as identifying word meanings, processing sentences, linking ideas across sentences, and inferencing. These components can be analyzed into myriad subcomponents and subprocesses; theories of comprehension (Graesser, 2007) do just that.

Many of the concepts central to these theories are difficult to define. Skills are those competencies that a reader brings to a text, such as decoding or inferencing abilities. Ideally, a reader has the skills that allow all the processes necessary for comprehension to work in concert, quickly and effortlessly, without reaching conscious awareness. Of course, reading does not always follow this idealized path. Sometimes even proficient readers stumble over unfamiliar vocabulary or abstruse technical explanations. When this happens, comprehension breaks down, and readers must employ conscious strategies to repair their comprehension. They might re-read a portion of the text, or they might ask themselves questions to highlight certain information in the text. In some reading situations, comprehension is quickly repaired and strategies go by unnoticed; other situations require deliberate effort.

Over the past few decades, a consensus has emerged that these strategies are at the heart of what should be taught to students to improve their comprehension (National Reading Panel, 2000; Pressley, 2005). Comparison of good and poor students suggested that poor readers often do not perform repair strategies when necessary. Indeed, they may even lack the ability to notice the inadequacy of their comprehension. These readers take a passive approach (Haines & Torgesen, 1979), and when their comprehension fails, they are not able to cope.

Current reading instruction focuses on helping readers learn and use strategies that will improve their comprehension. The goal is to enable students to internalize and automatize
these strategies, turning them into skills (Samuels, 2002). While the distinction between skills and strategies is easily made in the abstract, in practice it is difficult to differentiate one from the other. Educators use the terms in a variety of ways, and in some cases one would be hard pressed to identify a particular aspect of a student’s performance as either skillful or strategic.

The difference between cognition and metacognition is another important theoretical distinction. Metacognition can be broadly defined as cognition about one’s own cognitive processes (Flavell, 1979; Baker, 2002). Most definitions of metacognition have focused on two separate but related aspects: (1) knowledge/awareness of cognitive processes, and (2) control of cognitive processes. The first aspect can be further subdivided into the knowledge that people experience cognitions (theory of mind) and the awareness of one’s own cognitive processes as they relate to tasks and to other people. The second aspect of metacognition can also be broken down into two components, the monitoring of cognitive processes (knowing when they are and are not being used effectively) and the ability to regulate cognition to improve effectiveness (using strategies to repair comprehension failures, for example).

The distinction between cognition and metacognition also makes sense in the abstract, but it is extremely slippery. It is difficult if not impossible to categorize a particular reading activity as wholly metacognitive or not-at-all metacognitive. Moreover, some curriculum designers may describe their instructional programs as fostering metacognitive strategies while other curriculum designers may use largely the same set of instructional techniques but characterize them as promoting cognitive strategies.

A perusal of the recent literature suggests that as important as these distinctions may be theoretically, insisting on clear differentiations is probably less productive when it comes to working on instructional applications. As Duffy (2005) points out, “In reading instruction, metacognition is associated with reading strategies.” This seems clear enough for our purposes. In this chapter, we describe studies using the same language as the researchers who conducted the studies. Whatever the terminology, our focus is always on awareness and control of cognitive processes.

The study of metacognition was introduced by Flavell (1976), whose initial focus was on the development of children’s memory. Flavell traced the course of acquisition of the ability to reflect on and control one’s own memory processes. As they get older, children develop the ability to use strategies such as active rehearsal, organization into categories, and, later, elaboration (Kreutzer, Leonard, & Flavell, 1975). At a certain point, children become aware of their own memory processes and can begin to control them, by deliberately rehearsing the information they wish to remember or by organizing the information into categories. Some of this cognitive activity is done at an automatic level, as when a child, asked to remember a word list, recites the words in categories without any intention or realization of doing so. But when a memory task is more difficult, a child may apply a strategy with effort. At this point, he becomes conscious of what he is doing, and he is using a metacognitive strategy.

Flavell’s early work inspired two important strands of research, which up to now have remained rather separate. One, called theory of mind research, deals with very young children—toddlers and pre-schoolers. The other is currently centered on applications of metacognitive theory to instructional issues. Until recently, most of the second type of research has been focused on children at the fourth-grade level or older. Currently, there is some interest in looking at primary-level children.
Theory of Mind: The Precursor of Metacognition

The developmental progression of metacognition from awareness to regulation of cognitive processes is clear; after all, it is impossible to regulate something unless one first possesses it. It is less clear how these competencies develop; that is, what are the prerequisites for the knowledge and regulation of cognition and which environments and instruction can assist in their development?

Investigation of the earliest stages of metacognition is known as the study of the theory of mind (Flavell, 2000; Kuhn, 2000). In short, the development of the theory of mind is the precursor to the development of the first part of metacognition: knowledge of cognitive processes. To have a theory of mind means to be aware that one has knowledge and beliefs that are shaped by one’s experiences and that other people’s experiences shape their knowledge and beliefs. This awareness of cognition, and the separation of cognition from perception, typically occurs around the age of 3 (Kuhn, 2000).

The development of theory of mind can be assessed by a number of paradigmatic tasks that tap this understanding. A classic research paradigm is the false belief task. A child can be said to have a sense of belief (i.e., of a mental state) and therefore a theory of mind if the following scenario holds: the child sees someone put an object in a box and then leave. The child then sees someone else remove the object from the box and put it into a second box. If the child expects that the first person he observed, upon returning, will look for the object in the first box, he can be said to have a theory of mind. That is, he understands that people can hold beliefs that are contradictory to reality, that there is a distinction between the mind and the world (Wellman, Cross, & Watson, 2001).

In addition to the false belief test, other tasks such as perspective-taking and distinguishing between appearance and reality have been used to demonstrate that very young children grow out of their early egocentrism and acquire a “theory of mind,” such that they can think about mental states, and, as they get older, develop the knowledge that they can examine and control their own cognitive abilities. Once children have developed a theory of mind they have the infrastructure necessary to develop cognitive and metacognitive strategies. In other words, theory of mind is a prerequisite for metacognition, and those experiences and traits that lead to the development of a theory of mind also lead to the development of metacognition. In a sense, metacognition is the practical application of theory of mind to cognitive tasks; theory of mind provides the conceptual underpinnings needed to develop and use metacognitive knowledge (Lockl & Schneider, 2006). Children who see themselves and others as people who are influenced by their mental states and act upon them can then reflect on (and eventually regulate) these mental processes.

Language is closely related to the development of theory of mind. Most of the relevant studies of this relationship focus on the role of basic language skills in accelerating the development of the theory of mind (see Milligan, Astington, & Dack, 2007, for a meta-analysis of such studies). Other studies cited in this meta-analysis showed that a child’s exposure to and use of metacognitive terms (e.g., think, know, believe) are also associated with a more rapidly developing theory of mind (Milligan, Astington, & Dack, 2007). Thus research suggests that talking and hearing others talk about cognitive processes helps establish knowledge of these processes.

Recent longitudinal studies have shown that the relationship between language and theory of mind is bidirectional. Slade and Ruffman (2005) tested the abilities of 44 children with a mean age of 3.8 years (at first testing) in theory of mind, language, and working memory at two time points separated by 6 months. Theory of mind was assessed through a series of false belief tasks. Language was assessed using two semantic tests (vocabulary and linguistic concepts) and two syntactic tasks (word order and
embedded clauses). Working memory was also measured, through a modified backwards digit span task. After establishing the stability of the constructs and equating the sensitivity of the language and theory of mind tasks, Slade and Ruffman found that not only does language ability facilitate the development of theory of mind, but theory of mind can also facilitate the later acquisition of language. Working memory did not account for this relationship. Further, they found that both syntax and semantics play a significant role in theory of mind acquisition.

A longitudinal study by Lockl and Schneider (2006) examined theory of mind, metamemory, and language, focusing on the comprehension of metacognitive vocabulary. Lockl and Schneider assessed children four times at 6-month intervals, with the first assessment at approximately 4.5 years of age. The first testing consisted of three theory of mind tests (two false belief tasks and an appearance-reality task in which children answered questions about an object that looked like a different object). At the three subsequent assessments, metamemory, metacognitive vocabulary, and general vocabulary were tested. Metamemory was assessed through an interview in which the participants were presented with a description of the memory strategies of two different children and had to pick which child would have better memory. Metacognitive vocabulary was assessed by reading to the participants a story accompanied by pictures and then asking them about the character’s mental state.

Performance on the theory of mind tasks at age 4.5 predicted metamemory, metacognitive vocabulary, and general vocabulary up to a year and a half later. The correlations between metacognitive vocabulary and metamemory increased between the ages of 5 and 6. These two constructs showed a bidirectional relationship; that is, early metacognitive vocabulary predicted later metamemory, and early metamemory predicted later metacognitive vocabulary. Lockl and Schneider (2006) proposed that the acquisition of specific metacognitive vocabulary enables a child to think about his own memory and figure out what would enhance memory performance. Likewise, increased metacognitive knowledge of memory can aid the comprehension of metacognitive vocabulary.

Although there is some research on more “advanced” theory of mind in older autistic children and adults (Baron-Cohen, 2001), theory of mind research typically focuses on pre-school students and has not been of great interest to education researchers. However, as the latter become more interested in providing comprehension instruction to primary-level students, they may seek to learn more from this area of research. We come back to this point later in this chapter.

The Development of Metacognition in Young Children: Empirical Studies of Reading

The concept of metacognition was initially applied to the field of reading by Brown (1980), who described the reading process as involving strategic knowledge and action: smooth sailing—comprehension at an automatic level—until comprehension breaks down, and then conscious attempts to comprehend via re-reading, looking at pictures, figuring out meanings of unknown words, parsing sentences, etc. Brown proposed that a lack of metacognitive processing is the reason why many children are not successful readers. Since her analysis appeared, most of the research in reading comprehension has revolved around comprehension strategies: what they are, how they operate in ordinary reading, and what to do when they do not function well. This focus is also prevalent in research on the writing process (Griffith & Ruan, 2005). We have limited our review to studies that deal with preschool and early primary-grade students and do not review the much larger body of research involving older children.
Within reading research, metacognition has traditionally been viewed as a late-developing competency. For many years, educators and researchers believed that young children did not have metacognitive knowledge or skills and that metacognitive instruction was not only a waste of time, but quite possibly detrimental to a child's learning. One important objection to metacognitive instruction in reading is based on the concept of executive functioning, which involves the coordination of various cognitive processes to accomplish a task. Given the fact that executive functioning has a limited capacity, many educators believed that lower-level skills, such as phonological awareness and decoding, need to be mastered and automatized before executive functioning can devote resources to higher-level skills, such as metacognition.

Empirical studies, however, have demonstrated that children as young as 4 years old display metacognitive knowledge and strategies while reading. The true extent of metacognition is difficult to determine as children may possess knowledge and use strategies that they are unable to express (Juliebö, Malicky, & Norman, 1998). The early work on the development of metacognition in young children relied primarily on interview data (Paris & Jacobs, 1984). Thus, our understanding of metacognition in young children was, and—to the extent that many studies still use interviews—is, limited by the assessment methods most frequently used in research (Paris & Flukes, 2005). The observed differences in the metacognitive knowledge and strategies of younger and older readers, therefore, may not necessarily be true differences in metacognition, but rather variations in the ability to describe cognitive and metacognitive processes. While most studies rely on methods that involve students' verbal expression, some studies have attempted to assess the metacognition of young readers using methods that are not completely dependent on interviews.

Brenna (1995) conducted a case study of five fluent readers between the ages of 4 and 6 and found that they employed a variety of metacognitive strategies while reading. She observed the children reading unfamiliar books, interviewed them during and after reading, recorded the types of errors they made, and administered a role play in which the children discussed reading with puppets. It is important to note that the five participants in this study were not representative of children their age, as they were well ahead of their peers in reading ability and had home environments where reading was clearly valued. Nevertheless, these children do provide an example of efficient metacognition in young readers. While reading, the children displayed metacognitive strategies that were based on self-knowledge, task-knowledge, or text-knowledge. The two most fluent readers used strategies that combined semantic, syntactic, and phonological cues when their comprehension broke down. By contrast, the least fluent reader relied primarily on sounding out words (phonological cues) when she faced difficulties. Parental reports indicated that the more fluent readers had used phonological strategies to repair comprehension before they learned other strategies. Thus, a developmental model progressing from primary reliance on phonological strategies to use of a wider repertoire of strategies is apparent. Not surprisingly, the children used those strategies that their caregivers suggested and modeled most often. In addition to using a range of strategies, the students responded to the various methods used to detect metacognitive behavior in different ways. Some children exhibited and discussed strategies during the read-aloud and interview portions of the study, whereas others demonstrated knowledge of metacognitive strategies only during the role play (Brenna, 1995).

The study by Juliebö et al. (1998), mentioned earlier, also demonstrated the importance of using a variety of assessment methods when studying metacognitive knowledge in young children. These researchers examined metacognition in five first-graders whom the teachers identified as having reading difficulties, i.e., performance on literacy tests
indicated that these children were at an emergent stage of literacy. The children were given an intervention program consisting of 14 to 16 weeks of daily 30-minute videotaped sessions. Instances of metacognitive behavior on the videotapes were identified. Selected videotapes were then shown to the children who answered questions designed to help the researchers retrospectively to identify the children’s metacognitive processes. This procedure gave the children an opportunity to reflect on cognitive processes in reading without the confounding factor of memory. Interestingly, the first-graders were more likely to report an awareness of being right or wrong and to self-correct during the actual intervention, whereas they were more likely to display knowledge of comprehension and repair strategies during the retrospective videotaped sessions (Juliebø et al., 1998).

Phonics and use of pictures to identify words were the strategies most frequently identified in the retrospective sessions. This is consistent with Brenna’s finding that less fluent readers primarily use sounding-out strategies in solving comprehension problems. Most of the children did not report using more than one strategy at a time; this is consistent with other studies showing that beginning readers have yet to integrate multiple strategies (Brenna, 1995). While the retrospective sessions demonstrated that the children had knowledge of metacognitive strategies, it was less apparent that they understood when and why to use the strategies (i.e., that they had acquired conditional knowledge). This lack of metacognitive regulation is reflective of Markman’s classic studies (1977, 1979), which indicated that young children do not monitor their comprehension.

In a more extensive study of metacognition in beginning readers, Kinnunen, Vauras, and Niemi (1998) examined the comprehension monitoring processes of 132 Finnish first-graders (mean age, 7 years 10 months). This study provided evidence of comprehension monitoring even among students with poor decoding and listening comprehension skills. The authors used an online method of tracking reading speed and lookbacks (re-reading) at the sentence and passage level as indicators of comprehension monitoring. Across all students, comprehension monitoring was more apparent at the sentence than at the passage level, and also when the measure was reading speed as opposed to the number of lookbacks. Even poor decoders slowed down their reading when encountering semantic, syntactic, or factual knowledge violations at the sentence level. On the other hand, these poor decoders utilized repair strategies such as looking back and re-reading less often than average and good decoders. A similar pattern was observed when the children were divided according to listening comprehension skill. Good comprehenders were more consistent and effective monitors (Kinnunen, Vauras, & Niemi, 1998). These findings support the notion of a distinction in comprehension monitoring between knowledge of difficulties only in poor readers (demonstrated by slower reading) and knowledge plus strategic regulation to repair comprehension in stronger readers (demonstrated by lookbacks and re-readings).

In addition to these studies showing evidence of metacognition in young readers, there is also evidence of metacognition in young writers. Ruan (2004) investigated the metacognitive knowledge displayed by 16 bilingual Chinese/English first-graders using a dictation task developed by Cox (1994). This task required the children to dictate a story as a text for others to read. The task was designed to elicit metacognitive utterances related to the planning, regulating, and editing processes that are necessary for the dictation to conform to written conventions. Sessions were conducted at the beginning and the end of first grade, and taped sessions were analyzed for instances of declarative metacognitive knowledge (e.g., writing goals, text structure, and metalinguistic comments) and procedural metacognitive knowledge (e.g., planning, thinking, and regulatory comments). The children made significantly more procedural metacognitive comments at the end of first grade than at the beginning, but there was no change in the number of declarative
metacognitive comments from the beginning to the end of the year. A qualitative analysis revealed that procedural metacognitive comments included inner thinking (e.g., “. . . um . . .,” “I think . . .”), self-regulatory speech (e.g., “I am mixed up . . .,” “I mean . . .”), and other-regulatory speech (e.g., “Cross that out,” “Erase it”). It also revealed that the poor writers tended to make fewer metacognitive utterances, whereas “more advanced writers tended to comment more often on the task before, during, and after they dictated the story” (Ruan, 2004, p. 110). This study is noteworthy for its use of a novel tool for investigating metacognitive development in young writers. More studies are needed that utilize this dictation technique and other novel techniques that do not rely on children’s ability to explain their metacognitive knowledge.

These empirical studies lead to several conclusions. First, even young children possess and use metacognitive strategies while reading. Second, the choice of metacognitive strategies seems to depend both on the reader’s developmental level and the assessment method used. It appears that younger and less skilled readers tend to use phonological, or sounding-out, strategies when faced with comprehension difficulties, whereas older and more skilled readers also use semantic and syntactic cues to repair comprehension. While it seems clear that many young readers have knowledge of cognitive strategies and a metacognitive awareness of when their comprehension fails, it is less obvious that they are able to regulate metacognitive strategies in order to repair comprehension. More sensitive assessment methods and larger studies are needed to validate these conclusions.

**Metacognitive Reading Instruction for Young Children**

**Some Highlights of the Research to Date**

The National Reading Panel (2000) reviewed 205 studies that evaluated the effectiveness of teaching text comprehension. A small proportion of these studies dealt with primary-age children. Sixteen categories of instruction were identified in the review. There was a solid scientific basis for concluding that seven of these improve comprehension in non-impaired readers: comprehension monitoring, cooperative learning, use of graphic and semantic organizers, question answering, question generation, story structure, and summarization. Most of the reviewed studies evaluated the effectiveness of instruction in a single cognitive strategy. A smaller number of more recent studies evaluated the effectiveness of instruction in small sets or “packages” of strategies, which replicate more closely what actually goes on in a classroom, where single strategies rarely appear in isolation. No one strategy is always effective, and it is only through learning a number of flexible strategies that students can become metacognitively aware of the effectiveness of specific strategies in specific situations (Baker 2002). The corpus of studies in the NRP meta-analysis did not lend itself to attempts to distinguish between cognitive and metacognitive elements in the strategy research that was examined.

A study by Glaubman, Glaubman, and Ofir (1997) looked specifically at the use of a metacognitive method of instruction and provided evidence of the effectiveness of teaching metacognitive strategies through an investigation of question generation by kindergarteners. They taught children to generate questions according to three methods, one based on metacognitive theory, one based on active processing theory, and one conventional method. The metacognitive method focused on raising the children’s awareness of the processes involved in questioning during stages of learning question words (what, why, how, etc.), matching questions to knowledge, and understanding the purposes of questions. At each stage, the students were taught to think about the questions they asked and how the answers to these questions increased their knowledge. Students taught by the
active processing method participated in activities designed to encourage the generation of questions; the focus was to improve questioning skills and increase questioning vocabulary by generating as many and as varied questions as possible. In the conventional method, students were encouraged to generate questions throughout the day and in different parts of the curriculum, but there was no explicit instruction, and no specific portion of the day was set aside for training in question generation. Kindergarteners participated in the intervention for 15 weeks, with 30 minutes of instruction each week. The pre-test and post-test consisted of three measures, quality of questions (measured by categorizing questions elicited in response to seeing a hamster in a cage [pre-test and post-test] and an African statue [post-test]), story comprehension (measured by comprehension questions, sequence picture arrangement, and verbal recall), and self-directed learning (measured by observations of a problem-solving activity). The metacognitive training group fared better than the active processing or conventional groups on all three measures on the immediate post-test. On a three-month delayed post-test, the metacognitive group scored higher than the other two groups on the quality measure. However, there was no difference between metacognitive and active processing groups on story comprehension. Self-directed learning was not assessed on this delayed post-test.

The results of the Glaubman et al. (1997) study demonstrate the value of integrating metacognitive strategies into instruction focused on question generation in young children. They suggest that instruction in metacognitive awareness, in addition to typical instruction in reading and questioning strategies, can develop self-directed and regulated learners. Metacognitive training helps children internalize the strategies they use and promotes an awareness of when and why they are effective. This awareness bolsters the ability to transfer the strategies (as measured by their ability to ask questions about a novel object) to other situations in which they would be useful.

**Instructional Programs in Reading Comprehension**

Positive evidence of the effectiveness of metacognition instruction has contributed to the design of several broader instructional programs that are most often strategies-based. Sometimes the strategies are classified as metacognitive, while at other times they are considered cognitive strategies that are monitored and regulated metacognitively. Most of the instructional programs explicitly model the strategies and then provide scaffolding to ensure that the students understand and can use the strategies effectively. Some of them were designed for older students and then adapted for primary-level students.

Informed Strategies for Learning (ISL), developed by Paris and colleagues (Paris, Cross, & Lipson, 1984), was one of the first programs to be developed and demonstrated that metacognitive strategy instruction is feasible in the primary grades. ISL focuses on providing students with declarative (what strategies are), procedural (how to use them), and conditional (when are they most effective) knowledge about reading strategies. The procedural and conditional components of ISL made Paris a forerunner in understanding that students need knowledge of when and why to use reading strategies in order to implement them effectively. These strategies were taught to third-graders using explicit instruction, metaphors and visual images on bulletin boards, and information for teachers in how to incorporate the strategies into other areas of the curriculum. The instruction was provided in three stages: importance of strategies, specific strategies to use while reading, and comprehension monitoring. ISL instruction resulted in what has become a typical outcome for studies examining metacognitive strategy use: a significant increase in strategy knowledge and improvement on experimenter-developed comprehension measures, but no difference in performance on standardized tests. Thus, ISL students made significantly
greater gains on specifically constructed comprehension measures (cloze and error detection tasks) than non-ISL students and had more knowledge and awareness of cognitive and metacognitive comprehension strategies. However, this knowledge and awareness did not translate into improved performance on the Gates-McGinitie Reading Tests or the Tests of Reading Comprehension, where there was no significant difference between the ISL and control groups. It is not unusual in such studies to find differences on experimenter-developed tests but not on standardized tests. In most cases the former have been designed to focus specifically on the topics covered in the instruction, whereas standardized tests are likely to encompass a broader range of topics.

Reciprocal Teaching (RT; Palincsar & Brown, 1984) is one of the most researched and widely used programs for teaching comprehension strategies. The two main features of the program are its focus on teaching four comprehension strategies (summarization, question generation, clarification, and prediction) and that teaching is structured as a dialogue between the teacher and students. This dialogue includes modeling of the strategies, elaboration on students’ use of the strategies, assistance in their use, and feedback. Students are encouraged to participate in the dialogue until they can assist other students without the teacher’s help. A meta-analysis by Rosenshine and Meister (1994) examined 16 studies that evaluated RT. Studies that used a standardized test (11 studies total, two of which yielded significant differences) had a moderate effect size, whereas studies that used experimenter-developed tests (either short-answer or summarization tests; 10 studies total, eight with significant differences) had a large effect size. Five studies assessed the students using both a standardized test and experimenter-developed tests, and four of them yielded significant results on the experimenter-developed tests but not on the standardized tests.

In addition, Rosenshine and Meister (1994) divided the studies according to ability level. Studies of normal students and studies of students who were good decoders but poor comprehenders produced moderate effect sizes on standardized tests and large effect sizes on experimenter-developed tests. However, studies with generally poor readers (comprehension and decoding not assessed separately) resulted in null findings for standardized tests and a very large effect size on experimenter-developed tests. Thus, these students show even greater improvement than the normal readers and poor comprehenders when assessed on experimenter-developed tests but no improvement on standardized comprehension tests.

In examining the results by grade level, the researchers found evidence that RT was effective in fourth grade through college. There was insufficient evidence to make that claim for third-graders, because the three third-grade studies assessed the students with standardized tests and obtained non-significant results (Rosenshine & Meister, 1994). Because studies with older students also obtained non-significant results on standardized tests, it seems imprudent to conclude that RT is ineffective with young students. More recent studies, in fact, have provided quantitative (Boulware-Goeden, Carreker, Thornhill, & Joshi, 2007) and qualitative (Myers, 2005) evidence for the effectiveness of RT in primary grades, although the components are often modified to fit the needs of the teachers and students (Hacker & Tenent, 2002).

Pressley and colleagues (Brown, Pressley, Van Meter, & Schuder, 1996) developed a program called Transactional Strategies Instruction (TSI), which is based on instruction in connecting a text to prior knowledge, collaborative discussion emphasizing student application of strategies, and eventual internalization of the strategies that the group used to come to a consensual constructed interpretation. Like many other reading interventions involving metacognitive strategies, TSI entails long-term training with explicit instruction and modeling of the strategies as well as a focus on why the strategies are important and
when and where they are most effectively applied. Unlike many other interventions, however, TSI is focused on personal interpretations of texts.

A year-long quasi-experimental study of low-achieving second-graders (Brown et al., 1996) compared TSI instruction and more traditional instruction. TSI-trained teachers were compared with teachers who had no TSI training (matched on a variety of measures). Strategy awareness and achievement were assessed for six low-achieving students from each classroom, matched on reading comprehension scores. Students of TSI teachers reported more awareness of comprehension and word-level strategies, used more strategies on their own, and did better on literal recall of story content than the students of the non-TSI trained teachers. They also performed significantly better on both the word skills and comprehension subtests of the Stanford Achievement Test, an unusual result for studies of metacognitive reading strategies.

Collaborative Strategic Reading (CSR) is another multistrategy program designed to improve the comprehension of expository text (Vaughn, Hughes, Schumm, & Klingner, 1998). It features four strategies that students apply before, during, and after the reading process; students work in peer-mediated pairs or small groups. The strategies include: (1) previewing the text to be read, using prior knowledge of the topic; (2) monitoring comprehension and applying fix-up strategies; (3) getting the gist of each piece of text (e.g., a paragraph) by identifying the main character or object in the text and the most important information about that character or object; (4) using a wrap-up strategy to summarize key ideas and generate questions. This instructional package has been shown to improve reading comprehension in the elementary grades above fourth grade and middle school.

Vaughn et al. (2000) compared CSR instruction with a program that emphasized fluency on both fluency and comprehension outcome measures in third-graders. There were no differences between the two types of instruction. From pre-test to post-test, students assigned to both programs showed significant improvements in the rate of reading and number of correct words read per minute. Neither fluency nor comprehension instruction led to improvement in reading accuracy or in comprehension, as measured by the Gray Oral Reading Test. Results were comparable for low-achieving students and students with significant reading problems. Thus, like the rather similar RT, the effectiveness of CSR is more pronounced with children who are above the age of primary-grade students.

Self Regulated Strategy Development (SRSD), a well-researched program, focuses on teaching writing to learning disabled and at-risk students (Graham & Harris, 2003). This approach focuses on explicitly teaching both the strategies and the content necessary to write a coherent essay or paper. In addition, the program fosters self-regulation of the writing process by teaching metacognitive skills such as planning and monitoring, and motivating the students by emphasizing the importance of effort in the writing process. In a meta-analysis of studies evaluating SRSD in writing instruction (including one study of second-graders and one study of third-graders), Graham and Harris (2003) found that instruction that incorporated SRSD improved the quality, structure, and length of writing of both normally developing students and students with learning disabilities. No results on standardized tests were reported in this meta-analysis.

Integrating Listening and Reading Comprehension Instruction

Until recently school policy has been to wait until children have a fairly substantial level of decoding ability, sometimes to the point of fluency, before starting comprehension instruction. Recently, however, researchers have been interested in the possibility that early comprehension instruction could be productively initiated before students acquire
decoding skill. This has prompted an interest among reading researchers in the literature on oral language comprehension.

Kendeou, van den Broek, White, and Lynch (2007) conducted a longitudinal study in which they first looked at the oral language comprehension skills of 4-year-old children. The children were presented with aural and televised stories and demonstrated their comprehension through recall and by answering questions tapping factual and inferential knowledge of story events. At ages 8 and 10 these measurements were repeated, and the children were also given written stories. The comprehension measures from all three media were highly interrelated. Moreover, the comprehension scores at age 4 predicted later reading comprehension scores, indicating that the comprehension skills that are developed in pre-school contribute to students’ later reading skills. The authors also found that these early comprehension skills develop separately from basic language skills (e.g., decoding) and vocabulary. These findings provide a good first step in making a case for early comprehension instruction using listening (storytelling), as well as other non-textual media such as television, before children start to read.

Williams and her students (Williams, Brown, Silverstein, & deCani, 1994) developed the Theme Scheme, a narrative text comprehension program whose goal is to improve comprehension as manifested in both oral and written language. It teaches students to go beyond the plot level to the identification of the story’s theme. It consists of a series of questions designed to help organize the important story components and derive the thematic material and ends with questions that help extend the theme to specific and often personal scenarios. The first four questions focus on the important plot components from which a theme concept can be derived (main character, problem solution, and outcome). The next four questions encourage students to make the judgments that, when combined with the theme concept, lead to the identification of the theme. They are: (1) Was what happened good or bad? (2) Why was it good or bad? (3) The main character learned that he/she should . . . (4) We should . . . The final two questions are: (1) When is it important to . . .? (2) In what situation is it easy (or difficult) to . . .? While this Theme Scheme program represents a direct and structured approach to instruction, it also incorporates a substantial amount of class discussion that emphasizes metacognitive elements such as reflection and self-monitoring.

The program was evaluated in second- and third-grade classrooms in high-poverty schools (Williams et al., 2002). Compared with more traditional instruction, the program led to improved comprehension and identification of previously studied themes. The findings indicated that at-risk children at all achievement levels, including those with disabilities, were able to achieve some degree of abstract, higher-order comprehension when given instruction that combined structured lessons, a strategy (the Theme Scheme), and discussion. However, the program did not help students apply a theme to real-life situations or identify and apply non-instructional themes. The program had been successful in these respects when used with middle-school students, including those with learning disabilities. Perhaps this discrepancy in findings is an indication of the difficulty that abstract thinking poses for younger children.

A later version of the program contained field-tested activities that follow the three-step process for writing in the SRSD model (Graham, Harris, & Troia, 2000). The three steps are (1) writing answers to the Theme Scheme questions; (2) goal setting, brainstorming and organizing (the students compose an ending to a story according to a particular theme); (3) self-monitoring (the students use the Theme Scheme to evaluate whether they have fulfilled their goal for the ending they composed). This sequence of activities serves as the foundation for writing instruction within the Theme Scheme program.

Williams and her students have also developed instructional modules that will be
combined into a year-long second-grade program teaching expository text comprehension (Close Analysis of Texts with Structure: CATS; Williams, Hall & Lauer, 2004). The modules integrate listening and reading comprehension, embedding explicit instruction about text structure in social studies or science content. They follow an instructional model that includes explanation and modeling by the teacher, guided practice, and independent practice. The modules teach strategies that are used to comprehend text structures commonly found in texts: sequence, compare/contrast, and cause/effect. The text structures are introduced through lessons using familiar content. Then the students analyze short, well-structured social studies or science paragraphs using clue words, graphic organizers, and strategy questions.

Individual CATS modules have been evaluated successfully in at-risk schools. One module taught the compare/contrast text structure embedded in content instruction about animal classification. An evaluation of this module (Williams et al., 2005) randomly assigned teachers to one of three experimental conditions: (1) the text structure program; (2) a content program that used the same materials, including the well-structured target paragraphs, but did not focus on compare/contrast structure; and (3) a no-instruction control. The text structure program improved students’ ability to comprehend compare/contrast texts. They demonstrated transfer to non-instructed compare/contrast texts. Moreover, the text structure instruction did not detract from the students’ ability to learn new content. A similar program that focused on cause/effect structure through social studies content was evaluated according to the same experimental design and showed the same pattern of results (Williams et al., 2007). These findings provide evidence that formal, explicit instruction in expository text comprehension is feasible and effective as early as the second grade, an outcome that depended on the integration of listening and reading comprehension activities.

The instruction seeks to reduce the burden of executive functioning by internalizing and automatizing the necessary cognitive and metacognitive processes. The goals of the strategy instruction portion of the program are both to increase the number of comprehension strategies available to the children and to provide practice using these strategies so that the students will be able to use them on their own. There is a focus not only on what strategies are used for a certain passage but also why these strategies are effective for that passage.

The students in our programs have many opportunities to practice and enhance their metacognition. As one example, the program teaches them to identify the text structure through the recognition of clue words and a main idea sentence. After they can identify text structures, they learn to match strategies to the appropriate structure, and they decide which set of generic questions and which graphic organizer will aid their comprehension. Moreover, they are able to explain the basis on which they matched the strategies with the text structure. The ability to use these explicitly taught strategies to identify a text structure and then reflect on the strategies that were used is evidence of metacognition in these young students. As another example, the students monitor their comprehension when they participate in class discussions and integrate other students’ contributions with what the teacher has to say about them.

There is one aspect of metacognitive instruction that we do not incorporate into our program, however. We do not ask the students to reflect on the nature of strategies in general or why we use strategies (Williams, 2002). We do not call attention to their mental state or ask them to think aloud about their cognitive processes. Duffy et al. (1987) and Pressley (2005) have suggested that this type of instruction can be beneficial for young students, and there are many ways to insert this type of activity, e.g., by encouraging discussion of students’ individualized learning styles (Schreiber, 2005).
Others, however, feel that this type of instruction may be inappropriate at such an early age. Clay (1998), for example, suggested that it is not necessary for children to be aware of and be able to explain the processes that are going on inside their heads while they are reading, and that asking them to do so can interfere with fluent reading. She argued that this awareness develops without explicit attention being given to it, as children gain more experience with reading, as long as they have proper teacher support. Chall and Squire (1991) and McKeown and Beck (this volume) hold similar views. At this point, when the literature contains insufficient evidence one way or the other to make an informed decision, we hold to the latter view. We agree with McKeown and Beck (this volume) that attention to one’s own mental processes may distract students from placing their full attention on the text and on the message that the text conveys.

In sum, the research suggests that children in the primary grades can be taught to use metacognitive strategies to improve reading comprehension and, to a lesser extent, writing proficiency. Instructional programs that incorporate explicit metacognitive strategy instruction have been found to increase students’ knowledge of strategies and performance on experimenter-constructed tests, but they rarely result in gains beyond traditional instruction on standardized comprehension tests. In order to facilitate the introduction of metacognitive strategies to these young students, recent programs have sought to integrate the strategies into listening as well as reading comprehension activities. The goal of these programs is to expand the repertoire of strategies that children use to comprehend passages and to provide explicit instruction on when and how to use the strategies. This instruction appears to be effective in improving the comprehension of young students. The degree to which these young students need to be metacognitive in their implementation of the strategies is an important area for future research.

Teaching Metacognition to Teachers

Despite the great amount of enthusiasm concerning the effectiveness of comprehension strategies, there is not a great deal of attention given to comprehension strategy instruction in actual classrooms. We do know from classroom observations conducted by Moely et al. (1992) that strategy instruction, when it does occur, is more prevalent in second and third grade than earlier or later in elementary school.

Implementation of strategy instruction in the context of the actual classroom has proved problematic. It is difficult to communicate what is meant by “teaching strategies and not skills.” Moreover, proficient reading involves much more than implementing individual strategies. It involves an ongoing adaptation of many cognitive and metacognitive processes. Teachers must be very skillful—and strategic—in their instruction. They must be able to respond flexibly to students’ needs for feedback as they read. In order to do this, teachers must themselves have a firm grasp not only of the strategies they are teaching the children but also of instructional strategies that they can use to achieve their goal. This type of teaching is not easy, and teachers have not been prepared to do it.

An important study by Duffy and Roehler and their colleagues (Duffy et al., 1987) investigated the effect of training teachers to give explicit explanation of the reasoning and mental processes involved in reading. This Direct Explanation (DE) approach does not teach individual strategies, but rather focuses on helping students to (a) view reading as a problem-solving task that requires the use of strategic thinking and (b) learn to think strategically about solving reading comprehension problems. The implementation of the DE approach requires specific and intensive teacher training on how to teach the traditional reading skills found in basal readers as strategies. In Duffy et al.’s 1987 study of low-level third-grade readers, teachers were randomly assigned to one of two conditions.
Treatment teachers were shown how to provide explicit explanations, to analyze the skills presented in the basal reading texts, and to recast them as problem-solving strategies. There were 12 hours of training, which included one-on-one coaching, collaborative sharing among the teachers, observations of lessons and feedback, and videotaped model lessons. The comparison teachers were trained in classroom management procedures.

Student awareness of strategic reasoning was assessed in interviews throughout the year-long treatment. The students of the DE-trained teachers had higher levels of awareness of specific reading strategies and a greater awareness of the need to be strategic when reading than the comparison teachers’ students.

Although there was no difference between the two experimental conditions in the ability to use the basal skills they had been taught, the students of DE-trained teachers had a greater ability to reason strategically when reading. They also reported using strategic reasoning more frequently when actually reading connected text. On a standardized test (the Stanford Achievement Test), students of the DE teachers outperformed the students of the comparison teachers; the difference was significant on the word skills subtest but not on the comprehension subtest. On a second standardized test (the Michigan Educational Assessment Program), administered five months after completion of the study, the students of the DE-trained teachers maintained their superiority.

These results indicate that training teachers to teach metacognitive reading strategies to third-graders with reading difficulties can be effective, and that gains can be seen on both experimenter-designed and standardized measures. The authors attributed the lack of difference on the comprehension subtest of the SAT to both the limited amount of time that students were exposed to the intervention and the differences between the focus of standardized comprehension tests and what strategic readers actually do while reading. It should also be noted that the instructions in many of the classrooms were oriented toward acquisition of word-level processes and not what we usually consider comprehension processes.

Classroom-based naturalistic studies like this one are not easy to do; they require substantial funding, collaboration between researchers and school personnel, and a great deal of preliminary descriptive and correlational work. It is not surprising that there are very few such studies (Williams, 2002). The small amount of data that we do have, however, indicates clearly that instructional methods that generate high levels of student involvement and require substantial cognitive and metacognitive activity during reading can have positive effects on reading comprehension. Moreover, providing teachers with instruction that helps them use these methods leads to students’ awareness and use of strategies, which in turn can lead to improved reading comprehension.

We know that it is easier to demonstrate the positive effects of strategy instruction in the context of well-controlled “laboratory-like” studies than in the actual classroom. We also know that strategy instruction is not commonly seen in schools and that to implement strategy instruction successfully in real-life classrooms is very challenging. But it is possible to develop programs that focus on teaching teachers what they need to know in order to be successful comprehension instructors. Many questions can be raised. How extensive does teacher preparation have to be? Are direct explanation and/or collaborative discussion essential components of successful instruction? Is successful instruction the result of the particular strategies that have been taught in the studies reported here, or would a broader repertoire of instructional activities also be effective? Are other factors involved? In light of the findings to date, more research is certainly warranted, and a focus on teaching teachers what they need to know about comprehension strategy instruction appears to be the area within comprehension instruction that has the potential for moving the field forward (Williams, 2002).
Concluding Thoughts

The research of the last few decades has led to significant progress in our understanding of the nature of reading comprehension and how to teach it. The important role that cognitive and metacognitive strategies play has been documented extensively. But only recently has attention turned to the primary grades, and more research is needed at this level, especially within the natural setting of the classroom.

The evidence that comprehension strategy instruction can be effective for primary-level students comes mostly from studies that evaluate instructional programs that contain a variety of components and that are designed to be used as complete packages. Most of the components of these programs are justifiable in terms of theory. However, the studies have not been designed to determine which of them are in fact effective. Different experimental designs are needed to analyze these programs and get answers to this sort of question.

Teaching comprehension strategies effectively involves a high level of proficiency and flexibility on the part of the teacher. This requires substantial and intensive preparation. It is here, in our opinion, that further research should focus: on the development of effective instructional methods to help teachers understand the importance of metacognition. Only when teachers are aware of what their own comprehension entails will they be able to monitor their students’ reading and provide the right instruction for them. It is even more important for teachers to be metacognitive than it is for their students. Teachers must be reflective about what it is that they are doing when they teach, so that they can better evaluate how their instruction is affecting their students.

It is not surprising that theory of mind research on very young children and the applied metacognitive research on older students have developed independently. However, given the recent surge of interest in teaching primary students strategies for reading comprehension (as well as for other academic skills), it would be useful to make efforts to bridge the gap that currently exists between the two strands of research. A start has been made. Investigators have been looking for links between theory of mind tasks and metalinguistic tasks relevant to reading. Farrar, Ashwell and Maag (2005) have shown that performance on the unexpected location false belief task is correlated with performance on phonological awareness tasks, in particular rhyming, even after controlling for verbal intelligence and age. Both the theory of mind task and the language tasks involve the ability to deal with conflicting representations of the same situation (representational flexibility): in a rhyming task, one must ignore semantic associations and attend to sound correspondences. Similarly, Doherty and Perner (1998) found a link between the same theory of mind task and children’s understanding of synonyms, another language task requiring representational flexibility.

Longitudinal studies of preschool children, followed until they achieve literacy, would be of benefit, especially if a wide variety of linguistic measures were used. Such studies, which would suggest the causal direction of relationships between theory of mind skills and language (pre-reading) skills, might foster further theory development and might also help identify aspects of language that could be taught to young children as preparation for developing the appropriate metacognition necessary for successful reading comprehension instruction.

Even in the face of the great progress that has been made, and the reliance that we are currently placing on comprehension strategies, there is a caveat. We believe that the strategies that we are teaching our young students will serve them well when they are adults. But we do not really know whether the strategies that we are teaching our young students are those that proficient readers use in making sense of text. Perhaps that does not matter; it may be that the effectiveness of strategy instruction does not really depend on the
particular strategies that are taught. It may simply be that strategy instruction forces the students to pay attention and think about what they have read (Gersten, Fuchs, Williams, & Baker, 2001); whatever unspecified cognitive processes are at work is what is responsible for the improved comprehension. The greater effectiveness of instruction when it occurs in the context of small interactive groups (Swanson & Hoskyn, 1998) might be explained in the same way. Listening and responding to others in a discussion is an effective way to force attention and thoughtfulness to the topic at hand. We should not close our eyes to the possibility that approaches to comprehension instruction other than teaching strategies may be worth pursuing.

References


