Increasing metacognition in an attempt to improve comprehension

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Abstract

Comprehension is believed to be a metacognitive process in which readers are aware of and have control over the strategies they use to achieve comprehension. The purpose of this review was to investigate the exact relationship between metacognitive ability and comprehension. Research supporting the direct instruction of metacognitive strategies to increase comprehension is discussed, as well as literature that challenges the efficacy of direct instruction. Studies indicate that it is possible to increase metacognition through direct instruction, and there is a certain amount of transfer to comprehension. The evidence for transfer and durability of the effects is moderately convincing. Literature challenging the efficacy of metacognitive instruction found weaknesses in the studies, as well as a need for further research in comprehension instruction.
INCREASING METACOGNITION IN AN
ATTEMPT TO IMPROVE COMPREHENSION

A Graduate Review
Submitted to the
Division of Reading
Department of Curriculum and Instruction
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education

UNIVERSITY OF NORTHERN IOWA

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has been approved as meeting the research requirement for the Degree of Masters of Arts in Education.

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Comprehension is believed to be a metacognitive process in which readers are aware of and have control over the strategies they use to achieve comprehension. The purpose of this review was to investigate the exact relationship between metacognitive ability and comprehension. Research supporting the direct instruction of metacognitive strategies to increase comprehension is discussed, as well as literature that challenges the efficacy of direct instruction. Studies indicate that it is possible to increase metacognition through direct instruction, and there is a certain amount of transfer to comprehension. The evidence for transfer and durability of the effects is moderately convincing. Literature challenging the efficacy of metacognitive instruction found weaknesses in the studies, as well as a need for further research in comprehension instruction.
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CHAPTER 1

INTRODUCTION

Reading is more than just the decoding of symbols. It is an active process of constructing meaning by connecting old knowledge with new information encountered in text (Pearson, Roehler, Dole, & Duffy, 1992). Readers build meaning by engaging in a series of interactions with text. In these interactions, readers activate their own prior knowledge and relate it to the information perceived to be in the text. Using the text as a guide, readers gradually construct their own meaning, usually resembling the meaning the author had in mind. This construction of meaning is termed comprehension. Two theories used by researchers to explain this comprehension process have been labeled the transaction theory (Rosenblatt, 1978; Langer, 1986) and the schema theory (Anderson & Pearson, 1984; Taylor, Harris, & Pearson, 1988; Weaver, 1994).

The transaction theory emphasizes the reader/text relationship, and indicates that the reader and the text condition and are conditioned by each other mutually (Rosenblatt, 1978). The reader "transacts"
with the text, and meaning is constructed during this transaction process (Weaver, 1994). While constructing meaning, proficient readers often step into what Langer (1986) and Rosenblatt (1978) call envisionments. They define an envisionment as a personal text-world involving all the reader understands and experiences during the reading event.

The schema theory is comparable to the transaction theory, but places more emphasis on the prior knowledge that the reader brings into the reading experience. Anderson and Pearson (1984) define schema as "an active organization of past reactions, or past experiences." Taylor, Harris, and Pearson (1988) say schemata refer to the knowledge that readers already have stored in their memory. Skilled readers use their prior knowledge or existing schemata to predict as they read. Either their predictions are confirmed as they continue to read, or they realize they are wrong and correct their hypotheses. New information is either made to conform to their existing knowledge, or they modify their schemata to accommodate this new information. When new data conflict with previous knowledge, old schemata are
sometimes discarded for new schemata (Taylor, et al., 1988).

Comprehension research from recent decades emphasizes the strategic nature of reading (e.g., Burke, 1975; Goodman & Watson, 1977; Baker & Brown, 1984; Palincsar & Brown, 1984; Paris, Wasik, & Turner, 1991; Pearson & Fielding, 1991). This research suggests that proficient readers use a variety of strategies to aid comprehension and memory (Baker & Brown, 1984). Such strategies include previewing text to activate prior knowledge (Walraven & Reitsma, 1992), identifying main idea (Paris, et al., 1991), making inferences (Anderson & Pearson, 1984), self-questioning (Palincsar & Brown, 1984), and summarizing (Palincsar & Brown, 1984). This body of research also suggests that when text is complex and comprehension is blocked, proficient readers are aware of the breakdown and use "fix up" strategies to restore meaning (Duffy & Rohler, 1987). Baker and Brown (1984) label this knowledge and control of one's own thinking and learning activities metacognition. They describe metacognition as involving two separate components: knowledge about one's own cognition and the regulation of one's
cognition. The common belief is that skilled metacognition is directly associated with success in reading.

Research has provided evidence that less proficient comprehenders, as well as early readers, usually focus on reading as a decoding process and do not make metacognitive efforts to get meaning or make sense out of words (Goodman, 1975; Purcell-Gates, 1991). They fail to monitor their comprehension and so are often unaware that there is a problem, and rarely do they take remedial action even if a breakdown in comprehension is detected. When less proficient readers do realize they have failed to understand, they either don’t have a strategy to aid them, or they know a strategy but do not use it (Garner & Reis, 1981).

Taylor, Harris, and Pearson (1988) have found that teachers assess comprehension frequently by asking questions, but rarely provide explicit instruction to children on how to use comprehension strategies to enhance comprehension. Many researchers have argued that if students can be made aware of metacognitive strategies and learn their application through explicit instruction, then comprehension would increase and the
skills would transfer to independent reading situations (e.g., Cross & Paris, 1988; Duffy & Roehler, 1987; Goodman & Watson, 1977; Tierney, Readnace, & Dishner, 1990). They believe that this explicit instruction should be a prominent part of our reading curriculum. Students would learn how to take charge of their own learning, which is one of the ultimate goals in education.

However, some researchers have challenged the efficacy of explicit instruction of metacognitive strategies (Carver, 1987; Winograd & Johnston, 1987). Carver criticized the research of the 1980's which concluded that explicit instruction was successful in increasing comprehension. He said that the success of the studies was due to three principles -- the easiness, reading time, and practice principles. He also said that the strategies taught through direct instruction were actually study skills that would not necessarily transfer to independent reading situations. Winograd and Johnston (1987) agreed that researchers needed to evaluate the efficiency of these direct instructional approaches against other less time consuming approaches. The great amount of
instructional time they believe is necessary to make strategies automatic would most likely replace actual reading time, which they did not recommend. They also criticized the research for its narrow definition of reading comprehension.

Significance of the Study

It is the purpose of this paper to review and synthesize research for and against the teaching of explicit metacognitive strategies for improving reading comprehension. Different types of strategies will be investigated as well as the amount of time indicated as necessary for "internalization" of each strategy. The amount of transfer across texts and time will also be investigated. It is hoped that the findings of this research will provide information that can impact the decisions teachers make in planning their reading instruction. If there is strong evidence of a direct causal relationship between metacognition and comprehension, then a new dimension may be indicated for reading instruction.

Statement of the Problem

This review is intended to investigate the nature of the relationship between metacognition and
comprehension. The following questions will guide this investigation:

1. What is the relationship between metacognition and comprehension?
   a. If metacognition increases, will comprehension improve?
   b. Can comprehension be improved without increasing metacognition?
   c. Is metacognitive instruction the most efficient way to improve comprehension?

2. Is there evidence that when metacognitive strategies have been taught explicitly, there is transfer to other contexts?

Organization of the Paper

This paper has been organized in the following manner. Chapter 1 has provided an introduction and overview of the intent of this investigation. Chapter 2 will explain the comprehension processes of proficient and less proficient readers from the viewpoint of two widely received theories that currently exist in research: the transaction theory (Langer, 1991; Rosenblatt, 1991) and the schema theory (Anderson & Pearson, 1984; Weaver, 1994). The modes of
processing information in which readers engage will also be discussed. Metacognition will then be defined in Chapter 3, and the components that are involved in the comprehension process will be examined. Chapter 4 will review studies advocating the direct teaching of metacognitive strategies to increase comprehension, as well as research that challenges the efficacy of this type of instruction. In the concluding chapter, the evidence will be summarized and the actual relationship between metacognition and comprehension will be determined. For the reader's convenience, a glossary of terms is contained in the appendix.
CHAPTER 2

COMPREHENSION

Since the ultimate purpose of reading is to arrive at meaning, it is important for teachers of reading to have a theory of how readers get meaning from language. Two widely received theories that attempt to explain how readers construct meaning have been termed the transaction theory (Langer, 1990; Rosenblatt, 1991) and the schema theory (Anderson & Pearson, 1984; Weaver, 1994). This chapter will first discuss the comprehension of "proficient" readers, explaining what a successful reader does when comprehension is achieved. Secondly, it will provide some explanation for what a "less proficient" reader does or fails to do when comprehension is not achieved. The comprehension process will be discussed from the viewpoints of both the transaction and schema theories. Also included is a discussion on the different modes of processing that both proficient and less proficient readers engage in when reading text.
Comprehension of Proficient Readers

The transaction and schema theories, as well as theories about modes of processing information, have attempted to explain what occurs during the reading process when the reader is successful at comprehending the text. The term "transaction" has been used to designate relationships in which each element conditions and is conditioned by the other mutually. Thus, the transaction theory designates the reading process as a transaction, which indicates that the reader and the text condition and are conditioned by each other mutually (Rosenblatt, 1978). The schema theory emphasizes the reader’s past experiences or "schemata" that the text activates during the reading process which determines how the text will be interpreted. The modes of processing explain how the reader goes about processing the text, which contributes to the overall success of the reading process.

Transaction Theory

Meaning does not reside in the text or in the reader but is constructed during the "transaction"
between reader and text (Langer, 1991; Rosenblatt, 1978). "Every reading act is an event, a transaction involving a particular reader and a particular configuration of marks on a page, and occurring at a particular time in a particular context" (Rosenblatt, 1989, p. 157).

Reading, from a transactive viewpoint, is seen as a process in which the reader constantly shuttles back and forth from self to text in order to make textual and personal meaning. When a reader sees text, he or she brings accumulated experiences to mind in order to develop meaning. The reader uses cues from the text and these past experiences to guide expectations about what is to come and develops mental frameworks for this information. Using past experiences as a guide, text is assimilated into an emerging synthesis. The mental framework that develops is often revised and sometimes discarded when rereading occurs and new guidelines or mental frameworks are developed (Rosenblatt, 1978). Both reader and text are mutually defined and redefined during this process (Garrison & Hynds, 1991).

"The mind anticipates, looks back, and forms momentary impressions that change and grow as the
text-world develops. Each idea brought forth from the text is a stepping stone in the creation of the whole" (Langer, 1986). Comprehension often involves the creation of what Langer terms envisionments, "... a personal text-world embodying all she or he (the reader) understands, assumes, or imagines up to that point in the reading" (Langer, 1989, pp.4-5). She claims proficient readers step into and move through envisionments as they read by using ongoing text to make connections among their ideas in order to get a picture of the whole. At times they are forced to step back and rethink what they know or step out and attempt to look at the experience objectively. For envisionments to occur, it is important for readers to be able to read both aesthetically and efferently. When reading aesthetically they are paying attention to what they are experiencing, thinking, and feeling during the reading. When the purpose for reading is to glean information or to recall the meaning constructed from the text, they need to read efferently (Rosenblatt, 1991).

A proficient reader uses a proactive approach to reading: He/she takes charge of the reading experience
by varying the text/reader relationship (Langer, 1989). Meaning results from the constant interplay between the reader’s mind and the language of the text (Weaver, 1994). Therefore, not only is the reader’s approach to the reading experience important, but the context of the language plays an important part in the reading process as well. Weaver (1994) indicates that readers use the following contexts in the building of meaning:

1. Grammatical context within the sentence: refers to the function of words or their parts of speech.

2. Semantic context within the sentence: meaning brought to the word by other words surrounding it.

3. Situational, or pragmatic context: the topic of the writing or the situation being discussed.

4. Schematic context: knowledge we possess that has been brought about by our experiences.

Without mental schemata, or organized chunks of knowledge brought about by one’s experiences, Weaver believes it would be impossible to make use of grammatical, semantic, or pragmatic contexts.
Therefore, schema can be considered the foundation of the comprehension process (Weaver, 1994).

Schema Theory

According to the schema theory, meaning emerges as readers activate their prior knowledge and interact with the text. As they read, readers integrate new knowledge brought about from the text with their own background knowledge, or schemata, in ways that make sense. They bring meaning to the text in order to get meaning from it.

According to Rumelhart (1980), each schema provides a skeleton or base for understanding incoming data. Therefore, schemata determine how new information will be interpreted. When proficient comprehenders have enough information from the text, the clues in the text guide them in selecting one or several schemata that make sense of this information. As they read on, they evaluate how well their schemata fit with new incoming information. If the newly acquired information fits into a schema framework, this schema enables the reader to make predictions as to what will come next in a text. However, if schemata does not account for incoming information, the reader either
rejects the new information or modifies previous schemata to accommodate the new information (Brown, 1980; Paris, Lipson, and Wixson, 1983).

The following mental activities that involve schemata are used by proficient readers:

1. Using prior knowledge
2. Predicting
3. Determining "what's important"
4. Synthesizing information
5. Drawing inferences

Each of these mental activities and the way in which they involve the reader's schemata will be discussed separately in the following sections.

Using prior knowledge. Resnick (1984) claims that there are three kinds of prior knowledge that exist in a reader: 1) Specific knowledge about the topic: the amount of experience and knowledge one has on a topic affects the way in which the text is understood, 2) general world knowledge: the knowledge of social relationships, cause/effect relationships, and the knowledge of goals, plans, actions, and conflicts that take place in different situations, and 3) knowledge about text structure: the knowledge of conventions for
organizing texts, as well as the awareness of strategies that use text structure when processing information.

New information is learned and remembered best when it is integrated with prior knowledge, or existing schemata. Readers comprehend new ideas by relating them to ideas, experiences, and language that already make sense to them. Research has indicated that students with greater prior knowledge comprehend more, but this knowledge must be activated (Langer & Purcell-Gates, 1985; Pearson, Hansen & Gordon, 1979).

Predicting. Proficient readers construct meaning from text on the basis of their prior knowledge and experience. They activate that prior knowledge by anticipating and predicting meaning on the basis of what they already know about the reading content, and, while reading, they monitor their comprehension to see if predictions are confirmed or in conflict with the text. When conflict occurs, they either correct their understanding and construct new knowledge, or they elaborate on old knowledge. When new knowledge is constructed, predictions are apt to change and continue
to be either confirmed or modified (Nelson-Herber, 1985).

Determining "what's important". Determining "what's important" in texts is a critical part of the comprehension process (Pearson, 1992). In keeping with the idea of the importance of input from both the text and the reader, Winograd and Bridge (1986) made a distinction between "author-determined importance" and "reader-determined importance". Readers determine what is important based on their purpose for reading. Traditionally, most reading done in school has required readers to determine author-based importance, which is actually determining the author's perspective of the main idea of the text. Proficient readers are better able to judge the degree of author-based importance necessary to understand. They employ three different strategies when doing so. First they use their prior knowledge to "gain partial access" to the meaning of the text. Secondly, they identify and organize the information with their schemata. Finally, they use their knowledge of the author's purpose to help determine importance (Winograd & Bridge, 1986).
Synthesizing information. Proficient readers synthesize, or pull together information within the text or across texts when they read. This involves determining which information in the text is most important in order to create summaries. When readers summarize by synthesizing information, they delete irrelevant and redundant information, give a label to a list of things or actions (categorize), and locate and invent topic sentences (Brown & Day, & Jones, 1983).

Drawing inferences. Proficient readers constantly draw inferences during and after reading. This skill, according to Anderson and Pearson (1984), is an essential part of the comprehension process. Writers rely on the fact that there is a considerable amount of knowledge that they share with their audience. Writers will usually omit the shared knowledge that they assume will be accurately inferred by the audience (Anderson & Pearson, 1984). Readers make inferences when they use clues from the text to decide what schemata should be called into play in order to comprehend the text. They then use their schemata as an organizing framework for information. Readers use this framework to fill in

Modes of Processing

Taylor, Harris, and Pearson (1988) refer to three different modes of processing that readers engage in when reading text: top-down processing, bottom-up processing, and interactive processing. The mode that the readers are operating in can determine their success at comprehension. If readers are taking a more active role in the reading process, they are engaged in what has been termed top-down processing. This is when readers hypothesize about the text to be read using their own schemata. These hypotheses guide the processing of the following text. Then the hypotheses are either confirmed or proven wrong, in which case they need to be modified.

When readers are more passive, they are involved in what Taylor, Harris, and Pearson (1988) call bottom-up processing or text-based processing. This is when they don't hypothesize as actively, but instead wait for the text to reveal more information before they draw conclusions. In top-down processing, readers operate more in their own schemata, and in bottom-up
processing they are operating within the author’s schemata.

Proficient readers shift back and forth between the two when building comprehension, which is referred to as interactive processing. They activate their schemata in order to hypothesize about ongoing text, using their hypothesis for guidance (top-down). But, when a schema framework is vague or non-existent due to lack of prior knowledge, readers rely on the text to fill in the gaps, therefore operating more in the author’s schema (bottom-up) and building or modifying their own schemata frameworks. Proficient readers keep the author’s purpose in mind to help determine what is fact and what is merely the author’s opinion (Winograd & Bridge, 1986).

Comprehension of Less Proficient Readers

Both the transaction and schema theories of comprehension help to explain what normally occurs when a person reads and is successful at comprehending the text. These theories also benefit researchers and teachers in analyzing why comprehension fails.
Transaction Theory

Whereas a proficient reader’s purpose for reading is to construct meaning, many readers who are unsuccessful in building meaning for what they read perceive reading as mainly a decoding process. They are more likely to read in a piecemeal, word-by-word manner, focusing on each individual word (Gambrell & Heathington, 1981). Johnston and Winograd (1985) refer to this type of reader as passive, relying on the text to convey the meaning instead of constructing their own meaning using the text as a guide.

Instead of taking a proactive stance and taking charge of the reading experience by varying the reader/text relationship to create a whole, less proficient readers take more of a reactive approach. That is they react to text on the local level, looking at each idea separately. They make little attempt to tie what they are reading to their own experiences or to reflect upon what they have read. This overall passive, reactive stance makes it difficult for readers to move into envisionments (Langer, 1989; Purcell-Gates, 1991). When they do find their way into the personal text-world of envisionments, it’s not long
before they find themselves back outside trying to get in again. Instead of reading aesthetically, paying attention to the experiences and feelings produced during their transactions with the text, less proficient readers have a tendency to read only efferently, paying attention to the meaning of individual words or parts of text rather than creating a whole (Rosenblatt, 1991).

Less proficient readers often struggle with such language features as figurative language and inferred information. They often have a need for the language to be stated explicitly, word for word. Johnston and Winograd (1985) give two possibilities for explanations of less proficient readers' difficulties with the text, 1) they possess inherent language disabilities, and/or 2) they have been taught, or have interpreted instruction to focus on only surface aspects of text, therefore, never learning to actively construct meaning through the use of text as a "blueprint." They often have difficulty decoding words, which draws their attention toward the smaller pieces of the text and away from the meaning of the whole. Their struggle with language and being tied to the text makes the
text/reader transaction difficult and keeps less proficient readers out of a created literary experience.

Schema Theory

Since readers construct meaning by integrating information from the text with their own prior knowledge, without this base of prior knowledge about a subject, readers tend to experience difficulty and frustration in the comprehension process. In other words, if readers do not have well-developed schemata for a topic, they cannot build a clear or deep understanding of selections about that topic. Research indicates that the extent of the readers' prior knowledge is more responsible for individual differences in comprehension than measured reading ability (Johnston, 1984).

Some readers have the prior knowledge necessary to piece together the whole, but neglect to activate this knowledge at the appropriate time. They may fail to realize which of their schemata can be used to comprehend and interpret the text (Taylor et al., 1988), or they may fail to actively hypothesize and predict during the reading process in order to activate
the appropriate schemata. In this case they don’t monitor their comprehension to see if predictions are correct or if they need to be modified, strategies which are important in the elaboration and construction of knowledge (Anderson & Pearson, 1984).

It is also possible for a reader to have inaccurate schemata for a certain topic. These inaccurate schemata, or misconceptions, can overwhelm the information in the text. Further, the reader is unlikely to change or discard his or her inaccurate schemata, causing comprehension to fail (Roth, 1985).

Less proficient readers may have the necessary schema and activate it to comprehend a passage, but fail to maintain that schema throughout the reading. In other words, they forget what they are reading about, or have what is termed a schema maintenance problem (Taylor, et al., 1988). One reason for this problem may be that when readers start to focus their attention on individual units of text, such as letters or words, they are not able to extend the necessary cognitive effort needed to comprehend the meaning that the written symbols represent or bring forth to mind. Another possible reason for schema maintenance problems
has been labeled "inconsiderate text," that is, text that does not make clear how different ideas should be tied together. Proficient readers are usually able to create the necessary ties or infer the information not stated directly by the author, but less proficient readers find the connection difficult. They have a need for information to be stated directly since their ability to make inferences is weak.

As stated earlier in this chapter, making inferences is one of the mental activities that involves the reader's schemata: It is difficult if the reader does not have, or does not activate and maintain the necessary schemata. Since using prior knowledge, predicting, determining importance, and synthesizing information also rely on the reader's schemata, all these cognitive activities are difficult for less proficient readers (Pearson, et al., 1992).

**Modes of Processing**

Less proficient comprehenders quite often rely too much on bottom-up processing, depending on the text to reveal the meaning instead of drawing from their own schemata to create meaning. It is also possible for such readers to rely too much on schema-based
(top-down) processing. In these cases, they make semantically appropriate oral reading errors, "adjusting" the text to match their prevailing schema and to confirm their predictions. Although they may be able to develop a coherent understanding, it may not be the one intended by the author. Interactive processing, where readers shift back and forth between their own schemata and the author's text, is difficult for less proficient readers. They tend to stay in either the bottom-up or top-down mode (Taylor, et al., 1988).

Summary

The comprehension processes of both proficient and less proficient readers were examined in this chapter. What was not discussed was the amount of knowledge and control that readers possess and use in this process, which may be the determining factor in whether or not meaning is achieved. The knowledge and control that readers have over their own thinking is referred to as the metacognitive component of the reading process (Baker & Brown, 1984).
Effective reading comprehension involves more than understanding the message on a printed page. Comprehension is also believed to be a metacognitive process in which readers are aware of and have control over their comprehension (Baker & Brown, 1984; Burke, 1975). Since the late 1970’s, it has become difficult to find research or discussions on reading comprehension that do not include the term metacognition, or an interchangeable term.

Metacognition has been given a number of similar definitions. Garner (1987) sees the term metacognition as a label for a body of research and theory that examines thinking about thinking. Baker and Brown (1984) define metacognition as "the knowledge and control the child has over his or her own thinking and learning activities." Other terms that are interchangeable or related to metacognition are cognitive monitoring (Baker & Brown, 1984), comprehension monitoring (Palincsar & Brown, 1984), strategic reading (Paris et al., 1983; Paris et al.,
1991), and self-regulated reading (Palincsar and Brown, 1989).

Many researchers claim that metacognition involves at least two separate components: 1) knowledge about cognition; and 2) regulation of cognition (Baker & Brown, 1986). This chapter will first discuss the cognitive knowledge of proficient as well as less proficient readers. It will then explain what mechanisms are involved in the regulation of cognition, and how proficient and less proficient readers differ in these regulation strategies.

Knowledge about Cognition

Knowledge about one’s cognition, or metacognitive knowledge, refers to a person’s awareness about his or her own knowledge state or thinking abilities, and how compatible these cognitive resources are with the learning situation (Baker & Brown, 1986). This knowledge includes an understanding of what factors influence one’s reading, how skills operate or are applied, when particular strategies are required, and why these strategies affect reading (Cross & Paris, 1988). Metacognitive knowledge is stable; that is, one
would expect people to remain aware of their own
cognitive resources over time.

Less proficient readers have poorly developed
knowledge about how the reading system works. In
general, they do not possess knowledge of strategies
and often are not aware of when and how to apply the
knowledge they do possess (Goodman, 1975). Baker and
Brown (1984) believe less proficient readers lack
"sensitivity" to the demands of reading for meaning.
They seem unaware that they must expend additional
cognitive effort to make sense of the words they have
decoded.

The possession of knowledge is not synonymous with
use of knowledge (Garner, 1992). A learner can know
all the components of an effective reading strategy but
still not use the strategy in real-world situations.
Paris (1991) states "...knowing how to read is no
guarantee that students will become independent,
confident readers" (p. 35). The translation of
knowledge into action depends mainly on the reader's
motivation. Therefore, although metacognitive knowledge
enables readers to regulate their cognition, they must
be motivated to use this knowledge in order to foster,
or enhance, comprehension, as well as to monitor their comprehension -- two components of regulating cognition (Paris, 1991).

Regulation of Cognition

Proficient readers are not only aware of their cognitive knowledge, but are able to regulate this knowledge in order to comprehend text. Regulation of cognition is believed to be the self-managed component of metacognition. This area includes a variety of higher order thinking skills and problem solving activities, often called metacognitive strategies (Brown, 1984). Proficient readers regulate their cognition by using these metacognitive activities in the following manner: They plan their approach to the reading task, monitor their learning as they read, apply the necessary strategies that foster learning, evaluate and if necessary revise their approach to achieve meaning from texts (Brown, 1984). Palincsar and Brown (1984) separate the activities that involve regulating a reader's cognition into two categories: comprehension-fostering activities and comprehension-monitoring activities.
Comprehension-Fostering

Proficient readers use comprehension-fostering activities before, during, and after reading in order to enhance their understanding of text. Such activities include: 1) clarifying the purpose for reading; 2) activating relevant background knowledge; 3) focusing attention on the major content rather than unimportant details; 4) evaluating content for internal consistency and compatibility with prior knowledge; and 5) drawing inferences by predicting and making conclusions (Palincsar & Brown, 1984). Baker and Brown (1984) add skimming for main points and predicting as other strategies that aid in the comprehension of text. A successful comprehension-fostering strategy espoused by Boning (1987) was that of creating prereading questions to ask oneself by using just the title and cover of the text in order to activate prior knowledge (Anderson & Biddle, 1975; Rothkopf & Bisbicos, 1967). Self-questioning during and after the reading experience also fosters comprehension by helping the reader to interact with the text (Taylor, et al., 1988).
Less proficient readers often lack the knowledge of comprehension-fostering strategies and are usually not aware of when and how to apply the knowledge they do possess. "They often cannot infer conceptual meaning from surface-level information, have poorly developed knowledge about how the reading system works, and find it difficult to evaluate text for clarity, internal consistency, and compatibility with what is already known" (Duffy et al., 1987, p. 348).

**Comprehension-Monitoring**

When readers monitor their comprehension, they are keeping track of how successful they are at building meaning. They experience "clicks" when they are aware of cognitive success, such as understanding and remembering. They also experience "clunks" when they are aware of comprehension failure, such as information confusion or forgetting (Anderson, 1980). Comprehension monitoring is not often a conscious experience (Brown, 1980). Proficient readers proceed merely on "automatic pilot" until a triggering event alerts them to a comprehension failure. They then slow down and allot extra processing to the problem area, often using a "debugging device" or strategy to fix the
problem. Making oneself aware of how comprehension is progressing and taking remedial action when meaning is lost is all part of the comprehension-monitoring in which proficient readers engage.

When the reader comes to a "clunk" in comprehension, he or she may decide to store the confusion in memory as a pending question in the hope that the author will soon provide clarification (Baker & Anderson, 1982). The reader may also decide to take action immediately, which may involve a "fix-up" strategy such as rereading or looking back in the text, jumping ahead in the text, or consulting a dictionary or knowledgeable person (Garner, 1992). Pearson, Roehler, Dole, and Duffy (1992) believe that any reading skill worth teaching is a candidate for a fix-up strategy. For example, readers can resort to a deliberate search for main idea, cause-effect relationships, or sequences of key events. They can consciously try to summarize, draw inferences, or ask themselves questions to try to improve the situation. Furthermore, given the interactive nature of the reading process, it is likely that readers will invoke two or more of these strategies simultaneously.
In the research, fix-up strategies have been placed into two categories. One category involves word level strategies and the other category involves idea level strategies.

Word level fix-up strategies include:

1. Read around the word.
2. Use context clues for help in decoding or predicting what a word means.
3. Look for structural clues within words.
4. Sound out words.
5. Use a dictionary.
6. Ask for help.

Idea level fix-up strategies include:

1. Read on to make it clearer.
2. Reread carefully to make it clearer.
3. Look again at the title, pictures, headings.
4. Ask yourself questions.
5. Put ideas into your own words as you go along.
6. Picture the ideas in your head while you read.
7. Relate ideas to your personal experience.
8. Ask someone to clarify things.

(Taylor, et al., 1988)

Unlike proficient readers, many less proficient readers do not check their comprehension as they read and so are much less aware of problems in achieving meaning when they do exist. Therefore, they have no reason to "fix" the problem by using one of the above remedial strategies. Even when less proficient readers are aware of comprehension failure, they are less able to compensate for the problem. Their metacognitive base may not be rich enough to provide them with appropriate remedial strategies, or they just aren't motivated to expend the extra energy needed to remedy the situation (Garner, 1992).

Summary

Comprehension is believed to be a metacognitive process, in which readers have knowledge and control over their understanding of text. Since problems in comprehension for less proficient readers appear to be associated with their metacognitive ability (Baker & Brown, 1984), research has attempted to directly teach strategies that will increase their metacognition, therefore, improving their ability to understand.
Recent comprehension research emphasizes the relationship between metacognition and comprehension. This research suggests that proficient readers are aware of a variety of metacognitive strategies and use these strategies to foster and monitor their comprehension of text (e.g., Paris & Jacobs, 1984). In addition, the researchers claim that less proficient readers find it difficult to develop and use metacognitive strategies. Less proficient readers often do not possess knowledge of strategies and usually are not aware of when and how to apply the knowledge they do possess (Baker & Brown, 1984). Since reading success appears to be directly related to metacognitive ability (Pearson & Fielding, 1991), in a number of studies, researchers have attempted to "explicitly" teach strategies that increase metacognitive knowledge and/or the regulation of this knowledge in hopes of improving reading comprehension.
The chapter will be divided into two sections. The first section will discuss some of the more well-known studies that support "explicit" teaching of metacognitive strategies to improve comprehension. The second section will summarize literature that challenges the efficacy of direct metacognitive instruction used to improve comprehension.

Effective "explicit" instruction about reading strategies (also referred to as strategy instruction), according to Tierney et al. (1990), includes the following features:

1. Relevance: Students are made aware of the purpose of the strategy -- the why, when, how, and where to apply it.

2. Definition: Students are informed as to how to apply the strategy by making it public, modeling its use, discussing its range of utility, and illustrating what it is not.

3. Guided practice: Students are given feedback on their own use of the strategy.

4. Self-regulation: Students are given opportunities to try out the strategy for
themselves and develop ways to monitor their own use of the strategy.

5. Gradual release of responsibility: The teacher initially models and directs the students' learning; as the lesson progresses, the teacher gradually gives more responsibility to the student. This type of instruction is often referred to as scaffolding (Bruner, 1975).

6. Application: Students are given the opportunity to try their skills and strategies in independent learning situations.

As the research that supports and criticizes explicit strategy instruction is discussed, the features listed above will be included in the discussions.

Studies that Support the Direct Teaching of Strategies

This section will discuss representative studies in which students have directly and explicitly been exposed to metacognitive strategies with the goal of improving their ability to comprehend text independently. The studies that have been selected for discussion are well-known for incorporating the features listed above that should be present in order
for instruction to be considered effective (Tierney et al., 1990). The representative studies are most often referred to in current research reviews of comprehension instruction. Studies of teacher-directed instruction which were intended to improve comprehension of a specific text only, with no measure of transfer effects, will not be included. The section will be further divided into two subsections: studies that focus instruction on a single metacognitive strategy, and studies that are designed to increase students' general metacognitive knowledge and/or the ability to regulate this knowledge. Reviews of each study will address the type of instruction that was given (treatment), the time spent teaching the strategy or strategies, the type of measures given (only studies that included comprehension measures will be discussed), transfer of the taught strategy to new situations or tasks, and durability of effects (delayed testing to see if effects withstood time).

**Instruction Emphasizing a Single Strategy**

Several studies have attempted to improve students' comprehension ability by focusing instruction on a single metacognitive strategy (Baumann, 1984; Deitz,
Carr, & Patberg, 1987; Garner, 1992; Garner, Hare, Haynes, & Winograd, 1984; Hansen, 1981; Hansen & Pearson, 1983; Schunk & Rice, 1987). The specific strategies that will be reviewed in this paper are predicting (Hansen, 1981), main idea (Schunk & Rice, 1987), and inferencing (Dewitz et al., 1987). These strategies, which have also been labeled as mental activities that involve the readers schemata, have all been found to be important components of the comprehension process.

**Predicting.** Proficient readers make and evaluate predictions throughout the reading process (Nelson-Herber, 1985). Strategy instruction in predicting capitalizes on the importance of prior knowledge and attempts to increase in the children an awareness that they can make inferences by combining information from their previous experiences with ongoing events in the stories they read. In one well-known study of "prediction" instruction, Hansen (1981) taught second graders how to use a prereading strategy that utilized their previous experiences to predict events in an upcoming story. The instruction was applied to 10 basal-reader stories with four days spent on each
story. There was a treatment group and a control group (no intervention). During instruction the children in the treatment group were presented with this metaphor: We understand new information best when we can weave it into old information existing in our brains. The metaphor was made graphic by giving the children gray strips of paper which represented their brains, and colored paper that represented new knowledge. The instruction introduced the children to important ideas from the story, asked them to write related experiences on the gray slips of paper (old information existing in their brains), and then write their predictive hypotheses on the colored slips (new knowledge). As a follow-up activity, the children wove the colored strips into their "brains." All instruction and practice was teacher directed.

The researchers found significant difference in favor of the treatment group in the number of correct answers to comprehension questions over the instructional stories. Although those findings were very positive, on experimenter-designed transfer tests, consisting of passages that were read independently with comprehension questions following, there was only
a limited treatment effect when compared to the control group. Further, standardized scores on the Stanford Achievement Test favored the treatment group, but with no significant difference. A free recall measure produced no difference among the control and experimental group. No test for durability was given. The authors concluded that the results were positive, but may have been more dramatic if students would have had more explicit explanations regarding the process of inferencing and its benefits, rather than having it primarily modeled as was done in the study. The study has been criticized because of the lack of opportunity for self-regulation and application (see page 36 and 37 for features of strategy instruction) (Tierney et al., 1990).

**Main Idea Combined with Strategy Value Information.** As stated earlier, although a reader may know all the components of an effective reading strategy, he or she may still not use the strategy in real situations (Garner, 1992). The use of available reading strategies depends on the motivation of the reader. Some studies have attempted to include a motivational component as a part of their strategy
instruction in order to increase the use of the strategy. Since self-efficacy, or one's perceived capabilities, is hypothesized to affect one's choice of activities, effort expenditure, and achievement, one study attempted to increase the self-efficacy of 4th and 5th grade remedial readers in order to motivate them to use an explicitly taught strategy which involved finding the main idea (Schunk & Rice, 1987).

Treatment groups and a control group received explicit instruction in using a 5-step comprehension strategy which explained how to find the main idea of a passage. The treatment groups also received "strategy value information," or information that strategy use will help them perform better. For the purpose of improving the children's perceived self-efficacy, they also provided children receiving the treatment with feedback linking strategy use with their improved performance. All students received 35-minute training sessions over 15 consecutive school days.

All groups of children took comprehension skills tests at the end of the treatments. The effect that the main idea strategy instruction and use had on children's self-efficacy, or their perceived
capabilities for answering correctly, was also measured. The children who were given strategy value information combined with the main idea instruction rated their self-efficacy higher and performed significantly better on transfer comprehension skill tests than children in the other groups. It was perceived that understanding why the strategy was important made the students feel capable of completing the task, which led to improvements on comprehension measures. As with the prediction study, there were no maintenance measures for durability of treatments.

**Inferencing.** Readers need to constantly draw inferences during and after the act of reading for comprehension to be successful (Anderson & Pearson, 1984). Several studies have attempted to directly increase the inferencing ability of less proficient readers in order to improve their comprehension. One such study (Dewitz et al., 1987) added a metacognitive component to the research that included tests that attempted to measure the students' metacognition. These tests included an "awareness" section that asked subjects whether they thought they got the comprehension question correct, and a measure of
"regulation" asking what they could do to fix-up their lack of comprehension.

Three treatment groups received special instruction for eight weeks during 40-minute social studies class periods. One group was provided with structured overviews that identified key information and hierarchical information in text, which is similar to what is commonly known as semantic mapping (Johnson & Pearson, 1984). The teacher lead the class in a discussion on the overview before and after the reading of the passage. A second group was taught to use a modified cloze procedure to help them integrate background knowledge and text information to generate inferences, and therefore fill in the blanks with appropriate answers. The training for this group progressed from teacher-directed group work to individual student use. They began treatment by using specially prepared text with cloze passages, and then received help in transferring the strategy to intact social studies texts. A third group was trained with both the structured overviews and the cloze procedures. The two groups that received the cloze treatment were taught how to use a self-monitoring
checklist and encouraged to use this checklist when doing the cloze procedure. The checklist included questions like "Does the answer make sense?" and "Is the answer based upon a combination of knowledge you had before you read the passage and clues in the passage?" All three training groups were then compared to a treated control group who received vocabulary instruction and supplementary activities.

Metacognitive posttests scores of the two cloze strategy groups significantly exceeded the metacognitive scores of the other groups, in both awareness and regulation of comprehension. Both treatment groups that included the cloze procedure yielded superior gains in comprehension compared to the other groups as shown on comprehension tests that extended the information taught in class. The same results held true on comprehension tests over unfamiliar texts (transfer tests) given six weeks after the treatment. This shows durability of treatments that used the cloze procedure, which was the only strategy taught so that students could use it independently. However, there was also a far transfer test given six months after treatment in which some
treatment effects had disappeared. It was inferred that it may take more than four weeks of instruction for effects to emerge, and perhaps it takes repeated instructional practice to sustain the effects.

**Studies Designed to Increase General Metacognition**

The have also been several studies designed to increase students' general metacognitive knowledge and/or the ability to regulate this knowledge in order to improve comprehension (Duffy et al., 1987; Miller, Giovenco, & Rentiers, 1987; Palincsar & Brown, 1984; Paris & Jacobs, 1984; Pressley et al., 1991; Tharp, 1982; Walraven & Reitsma, 1992). The instruction in these studies consists of teaching a variety of metacognitive strategies instead of focusing on a single strategy. Four of the studies which were successful in increasing the general metacognition of children will be described (Cross & Paris, 1988; Duffy et al., 1987; Palincsar & Brown, 1994; Walraven & Reitsma, 1992).

**Reciprocal Teaching.** Reciprocal teaching (Palincsar & Brown, 1984) is a method which is well-known for its success at improving the comprehension ability of less proficient readers. It involves using
strategies that can be both comprehension-fostering and comprehension-monitoring if used properly. In this method of instruction, students take turns acting as leaders and followers in joint reading activities. Reciprocal teaching begins by the teacher modeling four key comprehension strategies: predicting, questioning (making up a question on the main idea), clarifying, and summarizing. The instructor then assigns a student to be the teacher. After reading a segment silently, the student-teacher for that segment proceeds to ask a question, summarize, and offers a prediction or asks for a clarification when appropriate. The adult instructor provides guidance, praise, and feedback specific to the students' participation. As students take turns using these strategies, they also are providing models for their peers, as well as giving each other encouragement, feedback, and correction.

Low achieving seventh graders received 20 days of intensive training in reciprocal teaching (Palincsar & Brown, 1984). This intervention was compared to a second treatment group that practiced locating information, as well as to control groups who received no specific instruction. In the locating information
procedure, instructors demonstrated and provided guided practice in answering text-explicit and text-implicit questions.

Training passages were expository and were read in segments during the reciprocal teaching treatment to allow for the students to take turns as leaders. Assessment passages were also expository, but included ten comprehension questions at the end of each passage. Each day students from both interventions took assessment tests before, during, and after training. The reciprocal teaching group answered the assessment questions independently, while the locating information group received feedback and guidance from the teacher. During their regular social studies and science classes, students took generalization probes (tests) that resembled the assessment tests but were taken from the text book actually used in their classes. Transfer tests were given on summarizing, predicting questions that might be asked, detecting incongruities, and rating importance of text segments: the latter two tests being used as measurements of general comprehension monitoring.
The reciprocal teaching group first showed an improvement in their dialogues, and then independent test scores began to improve. Reciprocal teaching led to a significant improvement in the quality of summaries and questions students asked pertaining to the main idea of the text as shown during the intervention and on transfer tests. Their ability to detect incongruous sentences embedded in text also improved according to these test scores. Comprehension of students receiving this intervention improved dramatically as shown on daily assessment passages, and this improvement generalized to the classroom comprehension tests. Reciprocal teaching also proved to be somewhat durable since there was no drop in performance after an eight week period. The locating information intervention did result in reliable improvement, although it was not as extensive or durable as that resulting from reciprocal teaching.

A second study was also performed (Palincsar & Brown, 1984), but this time with "real" teachers instead of investigators and in naturally occurring groups in school settings. The procedures and materials were the same as in Study 1. The results
were very similar to those found in the first study. The effects of the reciprocal teaching intervention were once again found to be reliable, durable, and transferrable.

Informed Strategies for Learning (ISL). Few studies examining the relationship between metacognition and reading comprehension have been conducted where strategy instruction was year-long, combining the intervention with "real" classroom activities involving reading, writing, listening, and speaking. One such study (Paris & Jacobs, 1984), which could be determined to be successful, also included instruction on how, when, and why to use reading strategies to enhance comprehension; the use of metaphors such as "Plan your reading trip" and "Be a reading detective" to help make the strategies concrete and sensible to students who then practiced using them as they read; considerable practice on the taught strategies with feedback; and application of the strategies in content area reading.

The third and fifth grade students involved in the study were first interviewed about their knowledge of reading tasks and strategies. This metacognitive
interview, which included questions on reading awareness and the regulation of reading strategies, was related to children's performance on several reading tasks. Pretest correlations revealed a significant relation between children's level of metacognition and comprehension skills, with a stronger relationship occurring for fifth grade children. Half of the children of each grade level were then given ISL, the year-long experimental curriculum described in the previous paragraph. The remaining students were used as a control.

After four months of the described metacognitive instruction, or approximately 30 hours, comparisons between tests revealed that the treatment group's metacognition about reading tasks improved significantly over that of the control group. Children who participated in ISL also made larger gains than control groups on cloze and error detection tasks, both of which serve as measures of comprehension that involve the use of several reading strategies. Standardized comprehension tests revealed no changes resulting from instruction, and it was suggested that the other two comprehension measurements may have been
more sensitive to the treatment because they required more strategy awareness.

**Instruction Involving Several Strategies.** As stated earlier, less proficient readers monitor their ongoing comprehension less actively than proficient readers and are less capable of using strategies when they notice a failure to comprehend. Their awareness of comprehension-fostering activities is low, they use fewer strategies, and they use them less flexibly (Palincsar & Brown, 1989). Therefore, several studies have focused reading instruction on improving children’s awareness and use of several necessary reading strategies (Duffy et al., 1987; Pressley et al., 1991; Tharp, 1982; Walraven & Reitsma, 1992). One intervention taught children between 10 and 12 years old who had problems in reading comprehension the following set of seven strategies: setting a purpose for reading; making predictions about the content; activating background knowledge; controlling comprehension; selecting important ideas; and summarizing and evaluating (Walraven & Reitsma, 1992).

Since it was also the intent of this study to assess the efficacy of direct instruction in which children
are trained to independently activate their own background knowledge, a second intervention group received the same set of strategies as mentioned above, with the exception of prior knowledge activation so that the treatments could be compared. Instruction was for approximately seven weeks and was given in 13-14 lessons lasting 35 minutes each. A third group of children served as a control and received no specific comprehension instruction.

The contents of the lessons for both treatment groups were sequenced in a cumulative fashion, increasing the number of applied strategies steadily. For example, the first strategy was introduced and practiced. Thereafter, the second strategy was presented, while the first strategy continued to be repeated and practiced, and so on. All strategies were practiced while reading expository texts. Instruction advanced through the following phases: (a) repeating relevant knowledge from previous lessons; (b) explaining the aim of the new lesson; (c) modeling the uses of a strategy; (d) guided practice; (e) independent practice; and (f) paraphrasing the new information of the lesson. During the independent and
guided practice phases, the procedure of reciprocal teaching was followed (Palincsar and Brown, 1984).

To determine knowledge of reading comprehension strategies, or metacognitive knowledge, students were given a questionnaire the researchers had designed for that specific purpose. Performance in reading comprehension was measured with a standardized cloze test, and a standardized test for main ideas. The authors made it clear that both the cloze and main idea tests lack sensitivity to strategic reading, and would only be used to measure indirect effects of teaching reading strategies to children.

Results indicated that both treatment groups increased their knowledge of strategies and their scores on the two comprehension tests. When the two treatments were compared, there was a significant difference between groups on the cloze test, favoring the condition which included prior knowledge activation, but this difference was not maintained on the durability measures four weeks later. There were no differences between treatments found on the questionnaire or the main idea test.
There was a significant interaction effect in favor of the treatment groups when compared to the control on the metacognitive questionnaire and the cloze test, which was used as a comprehension transfer measure. There was no significant difference on the main idea test, which was the second comprehension measure. Delayed measures of four weeks showed durability of both the questionnaire and comprehension cloze test. The researchers concluded that it is possible to improve the awareness and knowledge of comprehension strategies in readers classified as disabled, which in turn has some positive effects on reading comprehension tasks.

Training Teachers to Teach Strategies. All of the previous studies involved the teaching of metacognitive strategies to school children. A study which took a different approach trained teachers how to provide more detailed explanations of reading strategies than were taught as part of students' regular basal reading instruction (Duffy et al., 1987). Third grade teachers were taught in six two-hour training sessions scheduled throughout the school year how to recast their prescribed basal skills as problem-solving strategies.
by analyzing the cognitive and metacognitive components of the skill. These sessions also included one-on-one coaching, collaborative sharing between teachers, and specific feedback from the researchers. Control teachers followed their usual routines using basal textbook skill instruction. After six months of the intervention, the researchers found that teachers provided more detailed explanations about reading strategies to students.

Two interviews were used as measurements to determine whether explicit explanations are related to student awareness: lesson interviews measured students' awareness of lesson content, and concept interviews measured their awareness of the need to be strategic when reading. The less proficient readers who received treatment became more aware across time of lesson content in general. A significant difference in the total concept interview scores favored students in treatment classrooms. These results appear to indicate that students' metacognitive awareness increases when explanations about the reasoning associated with using specific strategies are explicit.
The reading section on the Stanford Achievement Test was used as a standardized measure to check for transfer of treatment. There was a significant difference favoring the treatment group on the word study subtest, but no significant difference on the comprehension subtest, which was both surprising and disappointing to the researchers. They attempted to explain the results by suggesting the possibility that (1) longer or more concentrated intervention would be necessary to alter standardized test performance, or (2) standardized tests may not assess strategic reading, which was the focus of the interventions. The reading section of the Michigan Educational Assessment Program (MEAP) was given five months after the study ended. Students in treatment classrooms scored significantly higher than their control counterparts on this particular test, indicating that the treatment may be somewhat durable and that standardized reading tests may in fact measure reading ability differently.

Summary

The majority of the studies supporting the direct teaching of strategies included metacognitive measures, and all of the studies including these measures noted
significant improvements by children receiving the strategy instruction. Children in the interventions also improved their ability to apply the strategies in the teaching situation. Some of the studies showed maintenance for the treatment effects over time, while some did not assess the durability of the treatment. Those that question the efficacy of strategy instruction noted the lack of treatment effects over time and, in addition, had other concerns that will be discussed in the next section.

Literature That Challenges the Efficacy of Metacognitive Instruction in Increasing Comprehension

The last decade has provided us with much research supporting the explicit teaching of metacognitive strategies to improve comprehension, but a fair amount of literature challenges the efficacy of this type of comprehension instruction, and criticizes some of the studies that espouse the direct instruction of strategies. This section will review the literature of three of the best known researchers in comprehension instruction, Ronald Carver, Peter Johnston, and Peter Winograd, who have some reservations about the direct
Ronald Carver (1987) criticizes research studies that indicated teachers should devote more time to the teaching of comprehension strategies in order to increase students' comprehension. He claims that the following three principles can account for the success of these studies: (1) the Easiness Principle - We can increase the degree to which students will comprehend passages simply by using passages easier than those at the frustration level, (2) the Reading Time Principle - Students can improve the degree to which they comprehend a passage by 50-67% (Carver 1977) when spending more time reading the passage, and (3) the Practice Principle - Students ordinarily improve on any reading-related task simply by practicing on that task, but there is no evidence that the task will transfer to reading and comprehending better in general.

Carver has studied the "dramatic" results of Palincsar and Brown's reciprocal teaching (1984), and concludes that almost any researcher could get this kind of result by somehow "inducing" students to spend more time reading and studying passages that are at
their frustration level. (It should be noted that Carver is inferring that the reading level of the passages used were at the frustrational level, but this information was not directly stated in Palincsar and Brown's study.) He claims the Reading Time Principle was completely ignored since there was no control for time spent reading the passages on the assessment tests. It was more than likely that students spent a much greater amount of time on posttests than they did on the pretests given before the treatment was introduced. If the students in the reciprocal teaching group had spent the same amount of time reading the passages on the pretest as they did on the posttest, Carver predicts they would have improved by only 30% to 40% instead of from 30% to 80%.

Recall that reciprocal teaching involved children acting as teachers and leading discussions about passages by predicting, questioning, clarifying, and summarizing text while receiving feedback from the other group members. Carver claims that Palincsar and Brown are misleading their readers in calling this procedure a "comprehension strategy," and suggesting that teaching the strategy will somehow help students
better comprehend material at their instructional or independent levels. He states that the reciprocal teaching procedure is actually teaching students "study skills" which will probably help them when they are forced to read material at their frustrational level in an attempt to understand and recall it later.

Carver has also critiqued the study done by Paris and Jacobs (1984) using metacognitive training to increase comprehension. This study combined the intervention, which involved instruction of how, when, and why to use reading strategies, as well as providing considerable practice and application of the strategies, with a variety of classroom activities. He questions the reliability of the instruction since, although there were medium to large effect sizes for the cloze task and error detection tasks, little or no effect was evident on standardized comprehension tests. The authors of the study had indicated that standardized tests may not be sensitive to the reading strategies learned by the children. Carver’s explanation for the results is that most of the metacognitive skills taught were actually study skills that are helpful when students have to engage in
problem-solving, when students are given frustration level passages, or when they are given untimed word skill tasks. There was no evidence that the metacognitive skills taught have anything to do with improving the normal comprehension processes that occur when reading materials are at the instructional or independent levels.

In general, Carver concludes that what has really been presented by studies that directly teach comprehension skills is that students can be taught study skills, how to answer inferential questions better, and how to comprehend more of materials that are at their frustration level of difficulty, although giving students reading material at their frustration level is ordinarily considered poor teaching. He points out that there is no real evidence that this so-called comprehension instruction transfers to an improvement in a general ability to read as measured by timed comprehension tests. Further, he claims there is no real evidence that students taught by these methods will somehow immediately reach a higher instructional level. There also appears to be no evidence that a reader will somehow better comprehend passages at his
or her instructional level without spending more time reading them, or in other words "studying" the passages. According to Carver, often the Reading Time Principle is not accounted for in research, and there is no solid evidence that gains due to the Practice Principle will transfer to reading ability in general.

Carver concludes that instead of devoting more time to teaching students strategies for understanding, reading time should be devoted to getting students to read more because this would increase their vocabulary, their prior knowledge, and their decoding efficiency -- three of the primary ingredients for improving general reading ability.

Winograd and Johnston (1987) have reflected on some issues they feel need attention if advances made in recent comprehension instruction research are to continue, and if research is to be translated into practice. Although research has provided teachers with some very effective strategies for developing children’s ability to comprehend, they believe this research has also provided a rather limited range of strategies, and has been weak in providing the knowledge of the conditions in which the use of a
particular strategy is and is not appropriate. They point out that some time needs to be spent exploring other approaches to teaching comprehension, their costs and benefits, and the conditions under which they are most appropriate.

One major concern of these authors, as with Carver, is the tendency for instructional techniques used in research to displace time spent actually reading real literature, the latter of which should be increasing in time. Also, the importance of allowing children to read books of their own choosing has been neglected in comprehension instruction. Most research-directed approaches to instruction are rather humorless and represent a "means-to-an-end" approach; in other words, they seem like "work". Winograd and Johnston would like to see more research focused on teaching children to be literate through "play" or enjoyable literary activities.

Further, the bulk of the research on comprehension has dealt with efferent reading, which is reading for information or to recall the meaning from the text (Rosenblatt, 1978). Winograd and Johnston find this rather limiting. What about the aesthetic side to
which Rosenblatt also refers? When reading for aesthetic purposes, the reading is done for the activity itself, and comprehension is made personal. Wouldn’t reading aesthetically also make reading more enjoyable, instead of making it into "work"?

Finally, the complexity of teaching and the accountability involved may be constraining research from reaching reality. Instructional research must be realistic in terms of its demands on the teacher’s time and effort. The pressures of accountability may cause teachers to focus on reading as if the transfer of information were the only concern, and to ignore reading as a way of developing relationships with children. These relationships may be crucial in influencing the development of children’s reading ability.

Winograd and Johnston (1987) conclude by pleading with researchers to concern themselves with the pragmatic aspects of how to make a difference to comprehension instruction in the classroom and to work toward altering the conditions that constrain classroom instructional possibilities. They suggest that other approaches, such as instruction using "real" literature
and enjoyable literary activities, need to continually be explored.

Summary

Researchers who challenge the efficacy of the direct teaching of metacognitive instruction have agreed that time spent on strategy instruction may be better spent involving children in the reading of real literature that is written at the children's independent or instructional reading levels, instead of at their frustrational level. Concerns have arisen that studies claiming the efficacy of direct strategy instruction actually show the efficacy of teaching study skills that will enable children to recall information. Critics express concern that the natural and enjoyable aspects of reading in instruction have not been included as a part of the context of the studies. Some researchers believe it is time to explore other approaches to comprehension instruction.
CHAPTER 5
CONCLUSION

The intent of this paper was to investigate the relationship between metacognition and comprehension by reviewing research for and against the direct teaching of metacognitive strategies to increase comprehension ability. The following questions guided the investigation:

1. What is the relationship between metacognition and comprehension?
   a. If metacognition increases, will comprehension improve?
   b. Can comprehension be improved without increasing metacognition?
   c. Is metacognitive instruction the most efficient way to improve comprehension?

2. Is there evidence that when metacognitive strategies have been taught explicitly, there is transfer to other contexts?

The paper began by describing the comprehension process of both proficient and less proficient readers, explaining the mental activities involved when readers
get meaning from language. Metacognition was then defined along with the metacognitive components involved in the reading process. An understanding of these processes is important in order to interpret the research discussed. Research in favor of the direct teaching of metacognitive strategies to increase comprehension, as well as literature that challenges the efficacy of this direct instruction was then reviewed.

Researchers appear to be in agreement that proficient comprehenders have greater metacognitive knowledge and are more capable of regulating this knowledge than less proficient comprehenders (e.g., Baker & Brown, 1984). Based upon this premise, researchers have conducted studies in an attempt to increase the metacognitive capabilities of these less proficient readers, and, in turn, to improve comprehension. If the instruction proved to be successful and comprehension of less proficient readers did improve, then there would be a need for change in methods of reading instruction.

The representative studies selected for review in this paper employed several different approaches to
increase students' metacognition. These approaches included the student use of self-monitoring checklists, using hands-on activities to make the strategy less abstract, modeling and scaffolding strategy instruction, providing considerable practice at applying taught strategies in a variety of reading and writing activities, and giving explicit explanations about the reasoning associated with using specific reading strategies. The amount of time spent on strategy instruction varied from 15 days to a year-long program. All studies included some form of immediate comprehension transfer test to see if increased metacognition improved general understanding of reading material. Maintenance tests for durability, which were included in several of the studies, were administered anywhere from four weeks to six months after intervention.

All of the approaches that were intended to increase metacognition were judged to be successful on measures such as interviews and immediate tests when compared to control groups. Significant improvements in comprehension were also seen on criterion comprehension tests, cloze tests, error detention
tests, comprehension skills tests, and tests to detect incongruous sentences. The few studies that included standardized comprehension tests reported no significant improvement following treatment, and it was reasoned that this was because standardized tests may not assess strategic reading, which was the focus of the interventions. The amount of time spent on instruction did not appear to be directly related to the extent of success of the intervention. There were no significant differences between treatment and control groups on transfer tests involving free recall or finding the main idea when these specific strategies were not included in the instruction, but the authors of the research pointed out that these tests were only indirect measurements, or that there was a weakness in the instruction (Tierney et al., 1990).

Comprehension measures (excluding standardized tests) for durability indicated positive treatment effects for up to eight weeks. One study (Dewitz et al., 1987) found treatment effects after six weeks, but after six months, improvements had started to fade. Authors speculated that intervention times had been of insufficient length.
Carver (1987) criticized the research supporting the direct teaching of metacognitive strategies and contributed the success of these studies to the Easiness Principle, the Reading Time Principle, and the Practice Principle. The Easiness Principle (the easier the material, the better the reader will perform) seemed to be an irrelevant factor in the representative studies. Most of the subjects were less proficient readers, and the reading material involved throughout the studies was not "easy" as was indicated by the description of the research. It was the goal of the researchers to use passages that were closer to the instructional level so there would be a need for strategies to be called upon in order to comprehend the text. Further, the researchers did not want the texts to be too difficult, since effective use of reading strategies breaks down at the frustrational level. It is probable that many of the less proficient readers read material written at their frustration levels when completing standardized measures of their performance. Many of the researchers speculated that these measures were not reliable, nor were they valid measures of the skills they had taught.
Carver also attributed the success of the studies to the Reading Time Principle: Students receiving treatment most likely spent more time on assessment passages after receiving strategy instruction compared to the amount of time they spent on pretests. This time element discrepancy was not stated in the actual studies, but can be assumed, since there were no time constraints on comprehension measures (excluding standardized tests). More than likely, students did spend more time on posttests than pretests, which would be necessary if they were using the strategies learned through the intervention. If children are "aware" that they need to slow down and use these comprehension strategies to help them understand, they have learned exactly what was intended for them to learn, indicating success for the intervention. These untimed tests could therefore be considered valid measures since researchers are testing precisely what they intended to test: by increasing the knowledge and use of reading strategies, readers will use these new strategies to increase comprehension. For this same reason, standardized tests could be considered invalid since readers would not have time to use their newly acquired
strategies as they would in a general reading situation. Further, with more practice using the strategies in real situations, it is hoped that they would increase the speed at which they process meanings.

Carver also submitted that the students were successful on the reading tasks that were practiced, but there was not strong evidence that the improvement on these tasks transferred to better comprehension in general, which he referred to as the Practice Principle. It held true that strategies practiced did improve on immediate measures of comprehension. In a majority of the studies, the researchers used a variety of comprehension measures to assess the transfer of this improvement to general reading ability. All but a few of these transfer measures indicated improved comprehension by students receiving the strategy instruction. Of those that did not show positive effects, most used standardized tests as the measure of results. As mentioned earlier, these results may be due to the time constraints and challenging reading levels of the standardized tests, or may be attributed
to the fact that the tests were not valid measures of what the children had learned.

Winograd and Johnston (1987) concur with researchers who believe that explicit teaching of reading strategies is an effective technique to increase children's ability to comprehend. However, they appear to question it as the most effective approach if, in fact, our goal is to create a love of literature within our students. Their concern that the time devoted to direct instruction tends to displace time for the reading of literature of the children's own choosing seems to be a valid one. Children learn by doing activities that are important and relevant to them. Wouldn't reading strategies seem more relevant to children if taught in the context of need in real reading situations? Another point made by these authors that deserves some consideration is that the aesthetic side of reading is usually left out in strategy instruction, forcing children to view reading as "work" and not as an enjoyable experience.

Studies have indicated that it is possible to increase metacognition by explicitly teaching metacognitive knowledge and the regulation of this
knowledge. Further, in a number of studies, researchers have found that by increasing metacognition, comprehension can be improved, at least to a certain degree. The evidence for the transfer and durability of these positive effects is moderately convincing. This is an area that needs further study.

Comments made by Carver, Winograd, and Johnston have made it apparent that the studies in question could have been improved in the following ways:

1. Reading material used during instruction and for assessment purposes should have been written at the students' independent or instructional levels since at the frustrational level strategies tend to break down due to overload on the readers' attention and ability to process information.

2. Since there were no time constraints during the instruction, there should not have been time constraints on tests used for the assessment. The instruction and testing conditions should be the same so children are able to use the strategies in the same manner in which they learned them.
3. Pretest and posttest measures should have been administered in similar conditions as well, for results to be reliable (e.g., untimed, etc.).

4. There should have been one or more delayed tests assessing the durability of the treatment. This would have provided more evidence of internalization of the strategy or strategies taught.

5. Instruction and some form of assessment should have been applied in real reading situations giving the students some choice of the books to be used.

As stated earlier, researchers appear to be in agreement that proficient comprehenders have greater metacognitive knowledge and are more capable of regulating this knowledge than less proficient comprehenders (e.g., Baker & Brown, 1984). A point that was not addressed by researchers in recent studies on comprehension instruction is how the proficient readers became proficient. In other words, how did they get this greater knowledge and capability? Was it through lots of experience in a literate environment, rather than from explicit strategy instruction? This information would appear to benefit researchers and teachers of reading. Furthermore, all studies used
direct instruction to improve metacognition. Would a
different kind of instruction be more effective? These
questions implicate a limitation on the studies, as
well as a need for further investigation.

In conclusion, what is the relationship between
metacognition and comprehension? Comprehension is
considered a metacognitive process, and by increasing
metacognition, comprehension can also be improved to a
certain degree. When comprehension has improved, there
is an apparent increase in metacognitive ability that
accompanies this improvement. Metacognitive
instruction appears to be effective in improving
comprehension, at least to some degree, but further
research is needed to determine if it is the most
efficient method. When metacognitive strategies have
been taught explicitly, is there transfer to other
contexts? The positive effects of metacognitive
instruction does appear to transfer to other reading
situations, but the evidence is moderately convincing.

Some important points about reading instruction
that have arisen throughout the context of this paper
deserve further consideration. Students learn by
doing, and teachers of reading need to allow time for
actual reading to take place if children are expected to practice and improve their reading proficiency. The reading material should be of interest and relevance to the children so that motivation to learn and apply needed skills and strategies is present. This can be made possible by giving children choice in what they read. Children need to be allowed to set their own purposes for reading, whether they read for information (efferently) or for the enjoyment of the reading and personal response itself (aesthetically). This will make reading meaningful. Children learn much more in the context of a real reading situation, perhaps when a problem arises, rather than from a direct teaching situation selected by the teacher and applied to the whole class. In teaching children to assume the responsibility for their own learning and to become independent learners, it seems best to teach only the necessary strategies that will enable them to self-regulate their own learning.
References


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Appendix

Glossary of Terms

Aesthetic reading -- reading for enjoyment

Efferent reading -- reading for information

Explicit instruction -- instruction in which learners are told precisely how to accomplish tasks and are systematically guided through a series of exercises leading to mastery.

Frustrational reading level -- the level at which a subject is completely unable to read with adequate word identification or comprehension.

Independent reading level -- level at which a subject can read and comprehend without assistance.

Instructional reading level -- the level at which a subject can be instructed profitably.

Less proficient reader -- a reader who is achieving less than what is expected at his or her grade level.

Metacognition -- the knowledge and control one has over his or her own thinking and learning activities.

Modes of processing -- the different ways in which readers process text.
Proficient reader -- a reader who is achieving what is expected at his or her grade level

Reading comprehension -- the act of building meaning; the successful accommodation and assimilation of the newly read information with the reader’s prior knowledge

Schema (plural form is schemata) -- a mental organization of past experiences; the knowledge that readers already have stored in their memory

Strategy -- a general learning plan selected voluntarily or reflexively in order to obtain or influence a reading goal

Transaction -- a relationship in which each element conditions and is conditioned by the other mutually