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The Effect of Direct Instruction of Macroprocessing on the Comprehension Monitoring Strategies of Developmental College Students

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THE EFFECT OF DIRECT INSTRUCTION
OF MACROPROCESSING ON THE
COMPREHENSION MONITORING STRATEGIES
OF DEVELOPMENTAL COLLEGE STUDENTS

by

Martha E. Casazza

A Dissertation Submitted to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the requirements for the Degree of
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ABSTRACT

Recent theories of reading emphasize the active, cognitive nature of the comprehension process. They also focus on the interactive rather than the hierarchical nature of individual reading skills. Implicit in this framework is the need for a student to monitor his/her comprehension as an ongoing activity. It has been suggested (Baker, 1975) that there are different sets of standards by which a student evaluates comprehension. The student's proficiency level seems to affect which of the three sets of evaluation standards, lexical, syntactic and/or semantic are applied. More specifically, the student's basic understanding of the reading process probably influences which, if any, of the standards are used.

The purpose of this study was to investigate the effect of teaching students the specific comprehension strategy of finding general to specific relationships in text on their use of the semantic monitoring standard of internal consistency. It was assumed that this reading strategy would focus the students on an active, meaning-orientation to text and also that if students were directly instructed to look for inter-sentential relationships as they read, they would be more likely to notice a sentence which was inconsistent with the others in a given passage. In other words, there should be a relationship between

teaching a strategy for comprehension and the spontaneous application of a monitoring standard to ensure that the strategy is working. This would lend support to the idea of the interactive nature of reading skills.

Two treatment groups were randomly formed from a population of twenty-four college students who placed in the 4th stanine of the Stanford Diagnostic Test. Each group consisted of three instructional units which met for thirty minutes twice a week for three weeks. The independent variable for the study was the treatment group. The control group was taught using a traditional repeated exposure method. During each session, the students read passages from Pauk's "Six-Way Paragraphs" (1974), answered the comprehension questions which followed and checked their answers against an answer key. They then entered the results on a diagnostic chart which highlighted any recurring areas of difficulty. The experimenter was present to manage the session and to ensure time on task.

The experimental group was taught using the direct instruction model, EMQA. The instructional format for each session followed a similar pattern of: direct explication of the strategy, teacher modeling of the strategy, student questioning and modeling, and independent activity. The construction of general to specific relationships in text proceeded from word units to phrase units to sentence units and finally to entire passages. The content for these

various units was adapted from the same materials used by the control group.

Following the six sessions of small group instruction, all students were assessed individually on a measure developed by the experimenter. Each student received a booklet containing four passages which had been adapted from an Introduction to Sociology textbook. Within each passage, the experimenter had embedded a statement that was inconsistent with the main idea. The students were told to read the passages for the purpose of finding the main idea and supporting details and also to underline anything that did not "fit" with the overall content.

The dependent variable of primary interest was the students' ability to identify spontaneously the inconsistencies in the passages. Another dependent variable was the ability to find the main idea for each passage. Two separate one way analyses of variance were applied to the resultant scores. In both cases the results were significant at the .01 level of significance which led the experimenter to conclude that direct instruction in finding general to specific relationships in text can increase the use of the comprehension monitoring standard of internal consistency. It also seems to increase the students' ability to identify the main idea of an expository passage.

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VITA

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CHAPTER I

INTRODUCTION

Within the last decade, the field of cognitive psychology has become influential in educational research. There has been a transition from studies based on behaviorism to those which examine cognitive processes. One result of this recent shift in emphasis has been a growing interest in metacognition.

Metacognition can be defined as an individual's ". . .self interrogation concerning the current state of one's knowledge during reading or any problem-solving task." (Brown, 1980). Baker and Brown (1984) assert that there is a hierarchy of terms involved in this area of study. According to them, "metacognition" is the superordinate term, and it encompasses both "cognitive monitoring" and "comprehension monitoring". Metacognition itself has two components: one's awareness of the skills that are necessary for a particular task, and one's ability to use self-regulatory mechanisms to ensure that the task is being successfully completed. (Baker and Brown, 1984). Cognitive monitoring refers to the overall use of these self-regulatory mechanisms, and comprehension monitoring

emphasizes an individual's ability to keep track of his/her success during the specific act of reading.

Comprehension monitoring has been defined by Baker and Brown (Kendall and Mason, 1982) as a cognitive process which "entails keeping track of the success with which one's comprehension is proceeding, ensuring that the process continues smoothly, and taking remedial action if necessary." This definition implies that reading comprehension must be viewed as an active, problem-solving activity. Indeed, Baker and Brown contend that comprehension monitoring is actually a "byproduct of the active comprehension process itself". (1984). They point out that the meta-cognitive skills involved in reading include: clarifying one's purpose, identifying important information, self-questioning, monitoring one's ongoing activities, and taking remedial actions when necessary.

The concept of reading as an active, complex cognitive activity is certainly not new. Comprehension monitoring is merely a new label for an idea formulated as early as 1917 by E.L. Thorndike. In his classic study which analyzed mistakes in paragraph reading, Thorndike set forth that, "Understanding a paragraph is like solving a problem in mathematics. It consists in selecting the right elements of the situation and putting them together in the right relations, and also with the right amount of weight or influence or force for each." (Gentile, Kamil and

Blanchard, 1983). He also referred to those pupils who thought they were comprehending, but who actually were applying inappropriate standards for judging successful comprehension. He noted that ". . .the reader finds satisfying solutions of those problems which he does raise and so feels mentally adequate; but he raises only a few of the problems which should be raised and makes only a few of the judgments which he should make. (Gentile, Kamil and Blanchard, 1983). In effect then, Thorndike was addressing the issue of comprehension monitoring 70 years ago, and he concluded that students were rather poor monitors.

More recent theories of reading which are supported by cognition research make explicit references to the area of comprehension monitoring. A model of reading which has been advanced by the Center for the Study of Reading includes four basic tenets. (Duffy, Roehler and Mason, 1984). It sets forth that reading involves: multiple levels of analysis being processed simultaneously, an interactive process rather than a hierarchical one, a constructive process, and a strategic process where the skilled reader continuously monitors his/her comprehension and is alert to any breakdown that may occur. Irwin's model of reading (1986) also stresses the interaction of cognitive processes which occur simultaneously. She identifies five basic comprehension processes of which metacognition is one. She defines metacognitive processing as, ". . .adjusting one's

strategies to control comprehension and long term recall. . .", and includes three components under its general label: comprehension monitoring, study skills and adjusting strategies. (Irwin, 1986).

For a student to effectively monitor comprehension, he/she must actively engage both evaluation and regulation strategies. As Baker suggests (1985), regulation assumes that evaluation has taken place, but it is important to make the distinction especially when conducting research. Evaluation occurs when a reader realizes that the printed material is not making sense. This is often the result of a "triggering event" which interrupts the smooth flow of comprehension. The "triggering event" could be that the reader's expectation for the material is not confirmed or that there are too many unknown concepts. (Baker and Brown, 1984). When this happens, Flavell suggests that the proficient reader reacts by slowing down, and entering a "strategic state". (Duffy, Roehler and Mason, 1984). At this point, the reader moves from evaluation to regulation. Regulation then involves applying appropriate fix-up strategies so that successful comprehension can proceed. The reader must have a flexible repertoire of strategies at this point as well as knowledge of how to apply them appropriately.

Since the present study will examine the evaluation portion of comprehension monitoring, it is important to

consider the various standards that readers seem to apply when they monitor themselves. Baker (1984) categorizes the standards into three groups: lexical, syntactic, and semantic. Use of the lexical standard suggests that the reader is focusing on individual word meanings. The syntactic standard is applied to check grammatical fit, and the semantic standard, which consists of five subsets, is used when the reader is looking for overall meaning. It seems clear that if comprehension monitoring is to be effective, the reader needs to integrate all three standards. Research has shown, however, that younger and often less proficient readers rely exclusively on the lexical standard. (Baker, 1985; Garner, 1981; Paris and Meyers, 1981). This seems to be compatible with what Thorndike found back in 1917 although he did not label it with the same terminology. Canney and Winograd (Garner, 1981) state that poor readers miss the overall point of a message because of a ". . .zealous focus on discrete language bits and pieces". Garner has labeled this "piecemeal processing" (1981), and adds that poor readers seem to concentrate on within sentence comprehension more than looking for between sentence relationships.

Perhaps the less proficient reader does not effectively monitor his/her comprehension because his/her purpose for reading is different from the author's purpose. If there is no expectation on the part of the reader that the

author has a main idea, then there is no reason to try to integrate the various units of meaning within a given passage. The reader relies on the lexical standard which seems sufficient and the overall meaning is lost.

In order to move the reader toward a more meaning-oriented standard, the concept of macroprocessing must be understood. Irwin (1986) includes this concept as one of the five basic comprehension processes in her model of reading. She defines macroprocessing as "the process of synthesizing and organizing individual idea units into a summary or organized series of related general ideas." If the reader is effectively using macroprocessing skills while reading, he/she is then distinguishing between general (or main idea) units and specific (or supporting detail) units of meaning. By actively organizing these units of meaning, the reader must be expecting the material to make sense, and also must be checking his/her comprehension with the semantic standard of evaluation.

The semantic standard of interest in this study is internal consistency. The use of this standard ensures that ideas within a passage are not contradictory. In order to effectively use the standard, the reader must be attempting to integrate idea units across the passage. When two units are not consistent, a "triggering event" is produced which should lead to an appropriate fix-up strategy. It seems clear that the inconsistency should serve as a "triggering

event" if the reader is applying macroprocessing skills to integrate the ideas. Thus, if the less proficient reader were given direct instruction in macroprocessing, we might see a shift from dependency on the lexical standard to a greater application of the semantic standard.

As a result of Durkin's observational studies (1981) in classrooms where reading was being taught, there has been much recent concern about instructional techniques. Too often it seems that students are simply told to use strategies rather than how to use them. A comprehension task is assigned and students are given a certain amount of time in which to complete it. Immediately following completion of the task, the student's work is assessed and he/she is judged to be successful or in need of additional practice. This "comprehension assessment" model of teaching reading never provides explicit strategy instruction to the student.

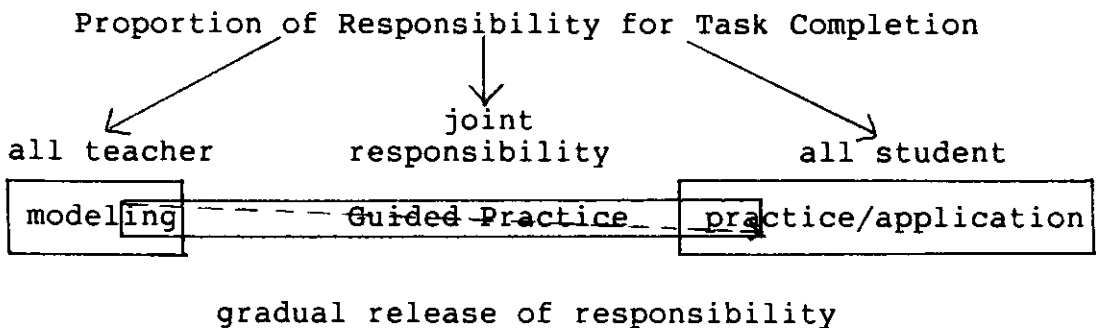
To ensure that this does not occur, the instructional intervention recommended by the present study is based on Irwin's concept of direct instruction. (1986). Her model, EMQA, includes the following components: explication, modeling, questioning and activities. It represents a teacher-centered approach in which comprehension strategies are directly explained, demonstrated and applied. Baumann (1984) has similarly provided the following definition for such a process stating that it ". . .occurs when the teacher

in a face to face, reasonably formal manner shows, tells, models, demonstrates, teaches the comprehension skill to be mastered."

Pearson and Gallagher's model of explicit instruction (Duffy, Roehler and Mason, 1984) also provides a similar operational framework for direct instruction which was applied in the present study. The model, illustrated below, seems especially appropriate for enhancing macroprocessing. It provides a gradual transition from teacher modeling to independent student application. It is also supported by Vygotsky's theory of cognitive development which contends that thinking strategies are first developed in social situations and that they must proceed from regulation by an "other" (teacher) to "self-regulation" in a gradual process (Duffy, Roehler and Mason, 1984).

Figure 1

Model of Explicit Instruction



This model seems particularly conducive to the direct teaching of macroprocessing skills. Cognitive skills need

to be overtly modeled before a student can be expected to apply them independently. The student must "see" the thought process that takes place for a successful reader rather than simply hear about it. To ensure that this occurs, the instructor must become a model by verbalizing his/her thoughts as the processes are taught.

Direct instruction in macroprocessing should increase the student's expectation that the text has meaning. The student should begin to actively organize the idea units in a passage in his/her attempt to distinguish general from specific information. This process should lead to the discovery of a main idea which serves as an organizer for the text. As the student's self awareness of this comprehension activity increases, his/her use of a semantic standard for monitoring comprehension may also increase.

In summary, interest in the area of comprehension monitoring has been increasing in recent years. There have been many studies which have attempted to analyze the term as well as to determine how readers actually employ the process. There has, however, been no effort to systematically investigate the direct instruction of macroprocessing strategies and the ability to monitor comprehension. Readers have been observed to see which standards they apply for evaluating their understanding of text. Less proficient readers seem to rely on a lexical standard rather than a syntactic or semantic one. This seems to be

symptomatic that the reader is approaching the text with "piecemeal processing". He/she is not integrating idea units across the passage as defined by macroprocessing. It seems reasonable to expect that if the reader's ability to use macroprocessing skills were increased, his/her purpose for reading would become more meaning-oriented, and consequently there should be a shift in monitoring standards. After receiving direct instruction in how to distinguish general ideas from specific details, readers might be expected to independently employ the semantic standard of internal consistency. Research indicates that a direct instruction model for teaching macroprocessing is likely to be successful. Irwin's direct instruction model provides a natural framework for the teaching of a strategy that is cognitive in nature and that requires the student to shift his/her approach to print.

Statement of the Problem

Comprehension monitoring is a developmental process which has a tendency to improve with age and reading proficiency. (Garner, 1980; Markman, 1979; Myers and Paris, 1978). Older, more proficient readers seem to be more flexible in the evaluation standards they use to check their comprehension. Rather than relying on lexical standards alone, they are also able to apply semantic standards. This strategy reflects their overall approach to reading. They are not reading for individual word

meanings, but rather they are integrating ideas across the passage. In order to be successful at this, they must be proficient at macroprocessing. It would seem, then, that since instruction in macroprocessing should increase one's intent to read for overall meaning, this instruction should also lead to a more frequent application of a semantic standard of comprehension evaluation.

Improved macroprocessing is most likely to occur if a direct instruction model is used. Since macroprocessing is a cognitive activity, the students need to first hear explicitly what it is and then to "see" it activated as the instructor models his/her thought process. Such a cognitive activity is too abstract for a student to internalize simply through repeated practice. There must be the gradual transition from teacher centered to student centered activity which direct instruction provides.

Direct instruction implies that not only is a particular skill being practiced, but its purpose is also being stressed. Thus, the student who is learning a macroprocessing strategy through direct instruction will also be learning that the purpose of the strategy is to increase one's comprehension across text. On the other hand, the traditional "comprehension-assessment" method for teaching reading often emphasizes practicing a skill for its own sake, and neglects to relate it to a meaning orienta-

tion. In this sense it may contribute to the frequent "piecemeal" processing that is so prevalent in poor readers.

Thus, the present study was designed to examine the effects of direct instruction in finding relationships between general concepts and specific details within a passage (macroprocessing) on one's ability to independently apply the semantic standard of internal consistency. A control group receiving traditional comprehension-assessment instruction was used for comparison.

The Nature of the Studies

A simple two treatment, completely randomized design was used for the study. The experimental group was randomly selected and given direct instruction in small groups on finding relationships between general concepts and specific details. The control group was also randomly selected and was given instructional material which continuously assessed their general comprehension skills rather than provided explicit instruction in the macroprocess of finding relationships across material.

The total sample consisted of twenty-four developmental college students enrolled on an urban campus whose reading achievement scores on a recently administered standardized test of reading placed them around the 30th percentile for college freshmen.

The instructional materials were developed from two sources. The experimental group received reading material

specifically designed by the experimenter to teach the process of seeing intra-passage relationships. The control group received a traditional reading booklet containing passages which assessed the reader's comprehension through post reading questions.

The post-test materials were developed from an Introduction to Sociology textbook written for college freshmen. Ten passages were field tested, and four were actually used in the assessment process. Each passage was about 160 words in length, and was measured on the Fry Readability scale. A sentence which represented an internal inconsistency was embedded by the experimenter in each passage. For the retained passages, the inconsistent detail contradicted the main idea in each case, and was contiguous to it for two of the passages and non-contiguous for the other two.

The post-test was administered individually. The student was instructed to underline anything that "didn't make sense" as he/she read each passage. The student was also told that he/she was reading for the purpose of finding the main idea and supporting details which were to be listed after the passage. The student was allowed to re-read the passage if necessary to reconstruct the information. The dependent variable of interest was the student's score on the assessment measure which indicated whether or not he/she accurately identified the main idea and also the score which

reflected whether or not the student recognized the embedded inconsistencies.

Hypotheses to be Tested

The following two null hypotheses were developed based on the anticipated results of the study.

Hypothesis One: There is no difference between treatment groups in ability to recognize inconsistent details within a given passage as measured by underlining while reading followed by probed questioning.

Hypothesis Two: There is no difference between treatment groups in ability to identify the central idea unit in a given passage as measured by the listing of the main idea.

Significance of the Study

Research has shown that less proficient readers often do not have a meaning orientation to print. They tend to process text in a piecemeal fashion; they are not aware of the need to integrate idea units across a passage in order for comprehension to occur. Direct instruction in macro-processing should enable them to interact with written text for the purpose of finding relationships between idea units and also to expect the material to make sense. As a consequence of this "re-orientation" to print, the reader may begin to apply comprehension monitoring standards which evaluate his/her overall comprehension.

If this study shows that direct instruction in the specific macroprocessing strategy of determining the

relationship between general and specific idea units leads to increased application of the semantic monitoring standard of internal consistency, then the method could be advocated as one to use with other less than proficient readers.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter will present findings from three research areas which have implications for the present study. Each area will be examined in terms of its relationship to the overall reading and learning process as well as to other relevant components.

The first area of research to be explored will be the cognitive process of comprehension monitoring. An overview of the reading and learning process will be presented first and will provide a conceptual framework for the research findings. Comprehension monitoring will then be discussed in relationship to current cognitive theories of reading comprehension and learning. Basic standards for evaluating comprehension success will be described, and variables which have been shown to influence the process in various populations will be considered.

The second area that will be discussed is the cognitive process of macroprocessing. First, this process will be related to a reading comprehension model. Then the recall and identification of main ideas across age groups and ability levels will be examined. Implications for

instruction as well as ability to summarize will also be considered.

The final research area to be included in this chapter will be that of direct instruction. Several models of direct instruction will be described along with studies which have used direct instruction for comprehension strategy training.

Based on the findings from these three areas of research, the author will draw conclusions and offer implications for the present study.

Comprehension Monitoring

Overview of the Reading and Learning Process

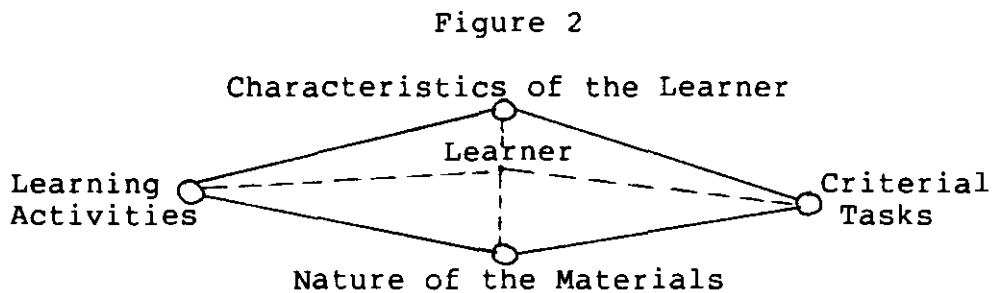
Traditionally, reading has been viewed, both for theoretical and instructional purposes, as a set of discrete, measurable subskills. Researchers have attempted to apply factorial analysis to the comprehension process and thereby to isolate the mental skills that are involved. The research of Davis (Gentile, Kamil and Blanchard, 1983) has been particularly notable in this area. His work identified nine "independent mental abilities and specific skills" which he felt were integral to reading comprehension. Two of these components, which he identified as having major impact, are still regarded as major pieces in the reading process. The first is "word knowledge" or vocabulary, and the second is "reasoning in reading".

Even though these components are still considered fundamental to comprehension, the models proposed by recent cognitive theorists apply them quite differently than the subskills models that followed Davis's research. Models that are based on sets of subskills often imply that reading is a passive activity. (Irwin, 1986). In this view, readers are dependent on the text rather than themselves, and on the application of a predetermined hierarchy of separate skills for getting meaning. There is no attempt to build in the more complex cognitive strategies that differentiate one reader from another. Establishing a purpose for reading and consideration of situational variables are not considered integral parts of such a process. Also, skills tend to be taught and applied in a hierarchy rather than in an integrated pattern. Thus, instruction which is based on such models often produces "passive readers who cannot comprehend in realistic situations that require active inference and strategy selection". (Irwin, 1986). As a result, comprehension monitoring, an active, strategic process, is not likely to occur.

There are several reading and learning models which focus on the reader/learner being an active participant who self-consciously applies appropriate strategies to cognitive processes. These will be briefly examined in this section

and will serve as a framework for the area of comprehension monitoring.

Brown, Campione and Day (1981) have proposed a tetrahedral model of learning in which the learner is indeed at the center. Their model includes four additional points which they believe are necessary for any cognitive learning to take place. This model incorporates elements which are integral to any active reading process, including explicit reference to comprehension monitoring. The model is shown in Figure 2.



In their description of the "learning activities" point on the model, Brown, Campione and Day define comprehension monitoring as a general strategy which includes activities such as, "generating hypotheses about text, predicting outcomes, and noting and remediating confusions." They continue to emphasize the importance of learner self-awareness when they discuss "characteristics of the learner". Two components which are delineated at this point are an individual's activation of prior knowledge and one's awareness of his/her limited short term memory for meaning-

less material. If one actively applies these two strategies while reading, any text violation of them should serve as a "triggering event" (Flavell, 1981) that comprehension is not succeeding. It also implies that the reader is in control of the process, a prerequisite to monitoring one's comprehension.

Integral to the "nature of the materials" point on the model is the student need to interact with the text. The reader needs to find logic and cohesion by using the author's written cues as well as applying other strategies. The final point, "criterial tasks" incorporates flexibility on the reader's part and a charge to him/her to first determine a purpose for reading and then to apply the appropriate strategies.

Brown, Campione and Day have proposed this model as psychologists interested in effective learning strategies. The interactive nature of the model emphasizes the importance of learner-centered activities as well as learner self-awareness. These components are essential for an understanding of how comprehension monitoring fits into an effective process of reading.

Two comprehension models that view reading as a cognitive process have been advanced by Just and Carpenter (1987) and Kintsch and van Dijk (1978). Both models describe the mental processes that underlie comprehension

and both emphasize the interactive, strategic nature of the processes.

Just and Carpenter (1987) propose that for a theory of comprehension to be valid, it must explain the "sequential integration" of information and also the "vertical integration" of the component processes. They have conducted eye-fixation studies which show that the reader interprets text in a sequential manner rather than a "wait and see" method. (Carpenter and Just, 1983; Just and Carpenter, 1980, 1984). For instance, when one encounters an unfamiliar word, there is a pause before advancing in the text. This infers that the reader may be processing one word at a time. According to the theory, this processing does not imply that the reader ignores contextual clues, but rather that the reader employs the active strategy of continually "testing" his/her original interpretation. The following example taken from Just and Carpenter (1987) illustrates this process. It also points out how various monitoring strategies must be routinely applied together in order for comprehension to take place.

Example: The old train the young.

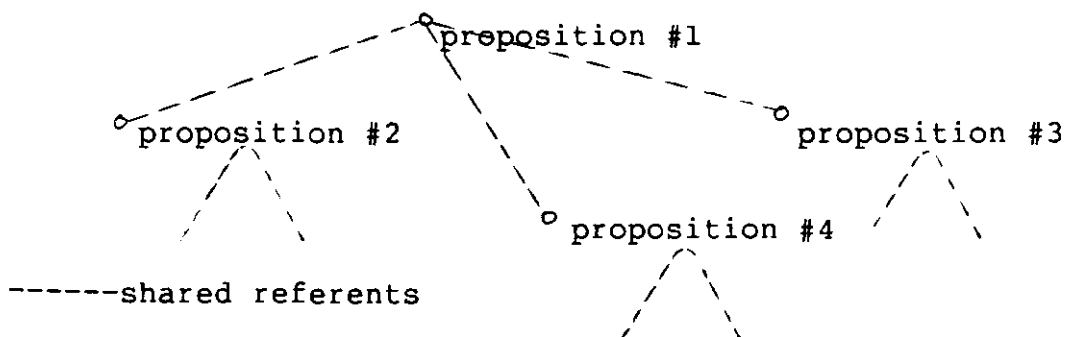
Just and Carpenter contend that readers experience a "startle effect" with this sentence because of its ambiguity. Readers tend to perceive "antiquated locomotive" rather than "the elders instruct". If they were processing more than one word at a time, they would not experience this

ambiguity. In order for comprehension to occur in this instance, the reader must be willing to change his/her initial hypothesis about the meaning. In order to do this, he/she must apply more than one standard for comprehension monitoring. A semantic standard as well as one for syntax must be applied by the reader.

Another important aspect of the Just and Carpenter theory is that the various components of the reading process operate in parallel. (1987). This is facilitated by a "working memory" which an individual uses to store information from each of the separate cognitive processes for a short term. It is in the working memory, for instance, where the syntactic and semantic monitoring standards would collaborate to determine the intended meaning of the sentence, "The old train the young." Without the collaborative effort of appropriate monitoring strategies, comprehension would not occur. These activities are "automatically evoked when the appropriate conditions arise." (1987). An active reader is assumed because decisions as to what to do next are made by the constantly changing nature of incoming information. This parallels Brown, Campione and Day's model of learning (1981) where the successful learner is characterized as one who is aware of his/her limited short term memory for meaningless material. The implication is that the information flow is a dynamic one and that when content is no longer needed, it is forgotten.

Kintsch and van Dijk, in their model of text comprehension, also emphasize that ". . . a multiplicity of processes (are) occurring sometimes in parallel, sometimes sequentially" during reading. (1978). Their model is based on the construction of a text base and is dependent upon a reader who continuously interacts with the text as he/she seeks a coherence among propositions. Like Just and Carpenter, Kintsch and van Dijk propose that chunks of meaning are stored in a short term memory buffer. As subsequent chunks are processed, they are continuously compared to those in storage. The reader accepts the new information as coherent only if a relationship can be found. On the surface level, processed text can then be represented on a "coherence graph" with a "hierarchical sequence of propositions." (1978). Figure 3 illustrates an example of this.

Figure 3

Coherence Graph

For a reader to be processing information in such a manner, he/she must be selectively storing information and deleting

information that doesn't fit. This implies a set of active strategies similar to those proposed by Brown, Campione and Day (1981) in which the successful reader is constantly monitoring comprehension. A text must be first "referentially coherent" before it is accepted for further processing.

The Kintsch and van Dijk model raises several questions regarding the differences between good and poor readers. For instance, does the short term memory capacity between the two groups differ? According to Perfetti and Goldman (1976), good readers seem to be able to store more text in short term memory than poor readers; however, when given a memory span test, the two groups did not differ. Kintsch and van Dijk suggest that this can be explained in terms of accessing time rather than memory capacity. Based on the observation of Hunt, Lunneborg and Lewis (1975), Kintsch and van Dijk conclude that poor readers conduct the process of "scanning and matching" information at a much slower speed than good readers. Kintsch and van Dijk also propose that the reader's familiarity with the content can effect the storage capacity. If the material is unfamiliar, it will be stored less efficiently because there is no existing frame of reference. Readers, lacking this prior knowledge, will continue to read and to search for information that will organize what they have already stored. (1978). If nothing is found, the memory buffer will become

overloaded with incoherent information, and the reader will not comprehend with success.

These questions suggest that the successful reader applies strategies similar to those proposed in the Brown, Campione and Day model of learning (1981). In other words, the learner is at the center of the process, has an appropriate set of strategies which he/she knows how to apply interactively and is independently in control of the task at hand. These models of cognitive processing have implications for the application of comprehension monitoring.

Relationship of Comprehension Monitoring to the Reading and Learning Process

In order to view comprehension monitoring within this reading and learning framework, one must first define what is meant by comprehension monitoring. Collins and Smith (1982) have defined it as, "the student's ability both to evaluate his or her ongoing comprehension processes while reading through a text, and to take some sort of remedial action when these processes bog down". This definition implies that monitoring one's comprehension is an active, cognitive process in which the reader takes charge of his/her understanding of text. The reader, not the text itself, becomes the center of the process. This was reflected in the model of learning set forth by Brown, Campione and Day (1981) in which the reader is not only at

the center of the process, but is in control and well aware of how he/she is processing incoming information. The model delineates comprehension monitoring as an integral aspect of the "learning activities" component.

The cognitive theories of reading which are described tend to be compatible with the following description of reading:

. . .reading is strategic. It is a flexible process that is adapted to the purposes of reading at a given time and is monitored to determine whether the purposes are being met. (Spiro, Bruce and Brewer, 1980).

Two important aspects of this description of reading are as follows:

1. it is a process
2. self-monitoring is an assumed component of the process.

The theories of both Kintsch and van Dijk (1978) and Just and Carpenter (1987) imply that for a reader to comprehend he/she must constantly and interactively apply standards of both external and internal consistency to incoming information. The standard of external consistency will be invoked when there is prior knowledge of the subject, and it can provide an organizational framework for the reader who is actively searching for internal consistency.

Kintsch and van Dijk particularly point out the importance of building a coherent memory representation of the paragraph. A study on comprehension monitoring

conducted by Markman (1979) demonstrates the inability of an immature reader to test for such a coherent text base. Using subjects in grades three through six, she read passages aloud which had both implicit and explicit inconsistencies. The subjects were asked to repeat what they had heard after every two sentences were read. She found that the younger children accurately repeated sentences that were explicitly inconsistent, but thought that they made sense. Thus, they were able to store the sentences in short term memory, but they were not comparing the two pieces of information. The sixth graders appeared to make a comparison spontaneously even without the verbal repetition, but were unable to do so for implicit inconsistencies. Markman concluded that in order for inconsistencies to be noticed, the following strategies must be employed: sentence meanings must be stored; sentence representations must be activated together and then compared; and for implicit inconsistencies, inferences must be made.

It seems clear that when reading and learning are viewed as cognitive, strategic processes in which the reader continuously interacts with the text in order to extract its meaning, comprehension monitoring must play an integral role.

Types of Monitoring Standards that are Applied During Comprehension

The Collins and Smith definition of comprehension monitoring that was given in the preceding section implies that there are two different sets of strategies that can be included under the general label of comprehension monitoring. The first set of strategies has been referred to as reader evaluation, and it includes those standards that a reader applies to text in order to determine if it makes sense. The second set of strategies has been identified as reader regulation, and it includes any remedial action that is taken when comprehension breaks down.

As Baker suggests (1984), comprehension monitoring then is not a "unitary phenomenon" and cannot be studied as such. It seems evident, however, that there is a relationship between the evaluation of one's comprehension and the regulation of it. Since evaluation must precede regulation, a reader who has difficulty evaluating his/her comprehension will consequently have difficulty applying regulation standards.

There is another aspect to the multidimensional nature of comprehension monitoring and that is the "variety of standards or criteria against which to evaluate one's comprehension" (Baker, 1984). Each of the standards present different processing demands on the reader, so that failure to use one effectively does not necessarily mean

that one cannot evaluate comprehension through the use of one or more of the other standards.

Also, a reader self selects the standards which he/she feels are appropriate in a given situation. To be successful then, the reader must have a flexible set of standards which is continuously adapted to the "characteristics of the material and (one's) purposes for reading it" (Baker, 1979). In other words, the individual must decide if comprehension is adequate for his/her purpose for reading. For example, if one is study reading, a broader range of semantic as well as lexical standards will be applied than if one is simply skimming for the gist of the material at hand. In the latter case, perhaps only the semantic standard of internal consistency would be activated.

Baker (1985) has proposed three basic categories for the evaluation standards of comprehension monitoring: lexical, syntactic and semantic. The lexical standard refers to the evaluation of individual word meanings. If applied alone, the larger text can be ignored as the reader attempts to understand each word separately. Application of the lexical standard requires a reader to simply search his/her vocabulary for the meaning of a given word. Baker (1984) and others (Garner, 1981; Paris and Meyers, 1981) have found that the lexical standard is often the only standard applied by younger and poorer readers.

Paris and Meyers (1981) concluded from their research that poorer readers adopt decoding rather than "meaning comprehension goals". They studied fourth grade good and poor readers' ability to monitor comprehension during oral reading. Two situations were set up; one for spontaneous monitoring and one for directed monitoring. In order to measure spontaneous monitoring, verbal hesitations, repetitions and self-corrections were recorded as children read two stories aloud. The stories contained nonsense words and phrases. For the directed monitoring activity, children were told beforehand that parts of the stories might not make sense and that they should underline anything they did not understand. The researchers were interested not only in which standard was applied by the children, but whether or not they applied it on their own. The results of the study indicate that the poor readers did intend to monitor as measured by the number of hesitations, etc. but that it wasn't as accurate as the good readers. Their overall understanding and recall was poorer even though they monitored the comprehensibility of words at similar levels to good readers. They did not, however, evaluate scrambled clauses as well. In the directed activity, good readers recognized 70% of the incomprehensible phrases while the poor readers noticed only 35%. Paris and Meyers suggest that perhaps this is related to poor readers having a goal

of decoding and pronouncing rather than evaluating overall meaningfulness.

In a follow-up study, fourth graders were given a story passage and asked to rate twenty reading strategies as to their effectiveness in helping a reader to understand and remember the story. The strategies were divided into positive, negative and neutral categories. These strategies were presented to the children in random order after they had read and studied the story. The children had been instructed to read the story and to study it so that they would remember it later. The results of the study indicate that poor readers rated positive and neutral strategies as well as the good readers, but were not as aware of the detrimental effects of the negative factors. For example, poor readers rated, "saying every word over and over" as a helpful strategy, while good readers ranked it as neutral. This again indicates the poor readers' focus on word by word decoding.

In a study by Garner (1981), poor comprehenders in grades five and six were asked to rate the comprehensibility of several passages. The passages can be described as follows: "informationally consistent", "informationally inconsistent", and containing "polysyllabic modifying" words. For the inconsistent passage, the researcher altered one word in the last sentence of a consistent passage that made it contradictory to the earlier sentences. For the

other modified passage, she inserted two polysyllabic words which were assumed to be unfamiliar to the readers. The information in this passage, however, was left consistent. When asked to rate the passages, the students chose those with the unfamiliar words as the most difficult to understand. Differences between informationally consistent and inconsistent passages were not significant. Even more interesting were the comments given when the readers were asked to explain their ratings. Responses were vague when the students were prompted to explain why the consistent and inconsistent passages were "O.K." or "not easy to understand". For the passages containing unfamiliar words; however, the comments were very specific. The students were all able to point to individual words as examples of why the material was difficult. Garner concludes that the poor readers are employing "piecemeal processing" and that they are much more concerned with "long words within sentences than with inconsistent information across sentences."

The lexical standard seems to be applied by most readers, but poor readers seem to rely on it more exclusively than good readers. Baker (1985) has referred to it as a "primitive" standard and found it to be used by 95% of all subjects, both of high and low verbal ability. The difference between the two groups is that the higher ability students used it in conjunction with other standards. These results were found in a study done with college students who

were given expository passages to read. The passages had information embedded such as nonsense words, prior knowledge violations, and internal inconsistencies for the purpose of giving students the opportunity to apply various standards.

Canney and Winograd (1979) offer further support of poor readers' reliance on processing "piecemeal". In a study that elicited responses to a questionnaire regarding reading, they found that, across grade levels, poorer students described reading in terms of decoding 79% of the time. Canney and Winograd conclude that the poor comprehenders ". . . have missed the whole point of reading, that their schemata for reading are flawed by a zealous focus on discrete language bits and pieces."

The second comprehension monitoring standard set forth by Baker (1985) is the syntactic standard. The use of this standard implies that a reader is attending to the grammatical rules in text. In a study of college readers conducted by Baker (1985), this standard was found to be the least used among both high and low verbal ability students when they were asked to read expository passages. This study did not specifically target the use of the syntactic standard, and so the passages were not embedded with "problematic" syntax. Student responses were categorized, however, for all standards that were applied and syntax was applied at a significantly lower level than that of the other non-

targeted standards. It was used slightly more often by the high verbal group.

Canney and Winograd (1979) found that, given text passages which had been altered syntactically, only the better comprehenders considered them unreadable. Sixty-three percent of the poor comprehenders found no problem in reading them. This suggests that the poorer readers were not applying a syntactic monitoring standard.

Isakson and Miller (1976) conducted a study with fourth grade students to determine whether good and poor readers differ in their sensitivity to both syntactic and semantic violations in text. The researchers manipulated the syntactic and semantic agreement between the main verb and other important parts of a sentence. The subjects were given cards showing three sentences: one was meaningful both syntactically and semantically, one had a semantic violation, and one contained both a semantic and a syntactic violation. Examples of these three types follow with the violations underlined.

- | | |
|----------------------------------|---|
| meaningful | 1. The old farmer planted the bean seeds in rich, brown soil. |
| semantic violation | 2. The old farmer <u>paid</u> the bean seeds in the rich, brown soil. |
| semantic and syntactic violation | 3. The old farmer <u>went</u> the bean seeds in rich, brown soil. |

Subjects were instructed to read each sentence aloud while the experimenter recorded errors such as omissions, substitutions, insertions and repetitions. The results showed that good readers were more affected by the errors than were poor readers. They made more errors across sentence types than did the poorer students. Both groups, however, made significantly more errors on the sentences that contained both syntactic and semantic errors. Isakson and Miller conclude that the poor readers were more insensitive to the syntactic and semantic cues of language than the good readers, and that they seemed to "treat words as individual entities". One interesting aspect of this study was that subjects were chosen who had equal ability in word identification skills, but who differed on reading comprehension ability. Thus, it would seem that the poor comprehenders are not applying strategies to integrate word meanings, and therefore probably are not able to evaluate their comprehension across words.

The final monitoring standard that Baker describes is the semantic standard. This standard involves reading for meaning and includes five subsets: propositional cohesiveness, structural cohesiveness, external consistency, internal consistency and informational clarity and completeness.

The first, monitoring for propositional cohesiveness, involves checking to ensure that ideas which are expressed

in adjacent positions are related logically. This has been studied by researchers who embed ambiguous referents or inappropriate logical connectives into text. Baker (1979) directed college students to read six passages which included the following confusions: inconsistent information, unclear reference to a previously stated noun, and inappropriate logical connectives, e.g., "however" for "therefore". Following the reading of these passages, the subjects were first asked to recall the information, and then the confusions were described to them. They were asked if they had noticed the confusions during their initial reading. The results showed that only 38% of the confusions were reported, even following the description of them, and subjects noticed only 23% of them on their own. The inappropriate connections were the least detectable as such, but were often labelled as "inconsistencies" by the subjects. This suggests that students may not be aware of the signals that connectives can provide during comprehension. The study also shows that with explicit directions, students' ability to find text violations increases slightly. Even though they did not appear to spontaneously monitor their comprehension, they were able to find inconsistencies when so directed.

The application of propositional cohesiveness was studied in a different way by Flavell, Speer, Green and August (1981). Working with kindergarten and second grade

children, a study was done which tested the children's ability to monitor their comprehension while listening to directions on a tape recorder. The taped instructions deliberately included ambiguous referents which made it difficult to adequately complete the given task of constructing a building with blocks. The results indicate that even though the subjects seemed to recognize ambiguous information, they did not realize the significance of it in relationship to their task. The younger subjects in particular showed evidence of confusion as measured by puzzled looks, hesitations and subvocalizations, but failed to note that the instructions had been unclear. They responded positively to the experimenter's questions concerning the adequacy of the given instructions and also to their ability to replicate the instructor's block building. In a follow-up study by Flavell, et al. (1981), memory was introduced as a variable to determine if it was a contributing factor. One group of subjects was asked to repeat the ambiguous instructions before they began construction. The results showed that the instructions, even when unclear, were repeated exactly as given. Evidently, the students were storing them in short term memory, but were not able to process them adequately enough to recognize ambiguous referents.

The second semantic standard suggested by Baker is that of structural cohesiveness. This is the measure which

is used to evaluate ideas in a passage for compatibility with overall theme. Baker's study (1985) focused on college students' ability to use three standards of monitoring (internal and external consistency and lexical); however, she gathered data on all standards that were applied by the students. Her findings indicate that the most commonly applied standard that was used by subjects spontaneously (i.e., those not given descriptions of possible problems) was that of structural cohesiveness. In the "higher verbal" group (determined by SAT scores), the standard was applied an average of 4.00 times compared to 3.46 times for the lexical standard, the second most popular standard for this group. In the "lower verbal" group, again the two most often used standards were lexical (3.58 average applications) and structural cohesiveness (2.95 average applications). The frequent use of this standard indicates that college students seem to be aware of basic text construction and the importance of identifying a main idea.

Other studies have looked at the structural cohesiveness standard more directly by embedding anomalous sentences in passages. One such study was done by Harris, Kruithof, Terwogt and TonVisser (1981). Using subjects from third grade and sixth grade, the study measured both the students' ability to monitor their comprehension as well as to apply "constructive processing" to the text. The subjects read four stories, each of which had one embedded sentence that

was anomalous to the given title. The amount of time that each student spent reading every sentence was calculated and also responses to the question, "Which line does not fit in with the rest of the story?" were recorded. The subsequent analysis revealed that both age groups read the anomalous lines more slowly than the appropriate lines, but that the older group identified a significantly greater number of the anomalies correctly. The younger group tended to select an inappropriate line as anomalous when asked to find the line that did not fit. The authors conclude that while the ability to monitor one's comprehension seemed to increase with age, the tendency to apply "constructive processing" as measured by a slower reading rate for confusing information, is not. An interesting extension of this data which is proposed by the authors suggests that for this particular age, the improvement in comprehension monitoring is related to "the capacity to notice or interpret internally generated signals, rather than to any differential frequency in the generation of these signals." (Harris, et al.). Perhaps children, through early reading activities, have an intuitive sense of text cohesion and thus are stimulated to confusion when this is violated. It seems that an instructional goal under these circumstances should be to increase their conscious sensitivity to such stimuli and their conscious ability to take active responsibility for processing any anomaly.

External consistency is the third semantic standard that can be applied to text according to Baker (1985). It relates to checking ideas which are in the text against those which one already knows. Application of this standard implies that the reader is accessing his/her prior knowledge of the subject and is sensitive to its importance in successful comprehension (Taylor, 1979; Johnston and Pearson, 1982).

One factor which affects the use of the external consistency standard is an unconscious application of the Grice Principle by readers (1975). This is seen when students, particularly poor readers, tend to accept any written text as the truth and, therefore, do not critically compare it to what they already know. These students have been taught that the answer is always in the book (Goodman, 1976), and consequently, it is not in their set of reading strategies to challenge the text. In Baker's study (1985) of comprehension monitoring, college students were "set" to expect "text-based" rather than "reader-based" problems. College students were given passages to read which contained confusions which had been intentionally embedded. All subjects were instructed to find problems which made the text difficult to understand. Those subjects in the "specific instruction condition" were actually shown examples of the types of embedded problems while the "general instruction" group was simply told to locate any

problems which might cause confusion. An example of an embedded violation of prior knowledge is as follows:

During the summer months most frogs hibernate in soft mud at the bottom of pools and streams.

In order for a reader to detect that "summer" should read "winter", he/she must not only have prior knowledge of the concept of hibernation stored in long term memory, but must access it and compare it to the text. Baker's results show that, for the general instruction group, nearly two-thirds of the subjects never applied the standard of external consistency. In the specific instruction condition, however, this standard, along with the lexical standard, was applied more often than any other. This could suggest that use of the standard is dependent on the reader's sensitivity to accessing knowledge that he/she does indeed possess, rather than on the ability to actually store the information. On the other hand, when follow up questions were asked regarding specific undetected problems, Baker found that often the students in the lower verbal group had a less extensive knowledge base than the higher verbal group.

In an earlier study with children, Baker (1984) had found that the external consistency standard was frequently applied when subjects were given explicit instructions on problems to expect when reading the text. The focus here was on ability to monitor rather than on spontaneity of

monitoring. The results indicate that across all age groups (five years, seven years, nine years, and eleven years) the external consistency standard was applied more often than either the lexical or the internal consistency standard. Both of these studies suggest that use of the external consistency standard increases with directed instruction.

The effect of explicit instructions on the external consistency standard was also explored in a study by Markman and Gorin (1981). Children aged eight years and ten years old listened to passages which contained internal inconsistencies as well as "falsehoods" or information which contradicted commonly held knowledge. There were three separate conditions: the neutral group was told to listen for any confusions; the falsehood set condition group was given examples of false statements; and the inconsistency set condition group was given examples of statements which contradicted each other. Each child listened to 17 stories, half of which contained inconsistencies and half of which contained falsehoods. The results indicate that the neutral condition group had the lowest rate of error detection and that the other two groups detected problems most frequently which were related to their instructional set. This suggests not only that the ability to monitor for such problems exists at a young age, but that children are able to adjust the standards which they apply. More specifically, children who had been given examples of false statements

were more apt to find them, and the same pattern was evident for those given directions to find inconsistencies. Another finding of this study which is relevant to activation of prior knowledge, was that subjects, particularly the eight year olds, more readily questioned the truth of error free statements. On the other hand, students rarely questioned the consistency of an error free statement with the information in the passage. This suggests that younger students may more readily question and compare written text to what they already know. Perhaps the college students' reticence to do this results from instructional conditioning where they learn to defer to the book for correct information.

Related to the external consistency standard is the semantic standard of internal consistency. According to the research, it is less often applied than the standard of external consistency even when explicit directions to do so are given. This strategy requires readers to compare statements within a passage to ensure that they are consistent with one another. In Baker's study (1985) with college students that was described earlier, she found that even when instructed to use it, half of the lower verbal ability students did not apply this standard. Baker suggests that this is reflective of a lower level of processing text and that perhaps poorer readers do not have the ability to access their memories and compare content

across text as well as to draw logical implications which is required in order for internal consistency to be applied.

Similar results were found for good and poor junior high students by Garner (1980). The students each read two passages, one in which inconsistencies had been embedded, and one which was presumably consistent. After reading sections of each passage, the students were asked to assume the role of editor and to indicate whether or not the section had been "easy", "O.K." or "difficult" to understand. Good readers not only noticed the inconsistencies more frequently than the poor readers, but were able to specifically point them out when so directed. The poor readers rated both types of text similarly as far as difficulty level, and were able to provide only generalized feelings of confusion when asked to identify the source of the problem. It seems evident that the poorer readers did not have a strategy for coping with text confusion, and that they were not attempting to integrate information across the passage. The good readers, on the other hand, seemed sensitive to the need for text coherence. Possibly as Kintsch and van Dijk suggest, they were constructing coherence graphs as they read, and thus readily noticed disruptions.

Markman (1979) discovered that older children, sixth graders, were more likely to find embedded inconsistencies when listening to text than younger children, third graders,

when directly informed that problems existed. Even though the younger children were still unable to detect inconsistencies when so informed, it seemed to affect their approach to reading. Their strategy became one of questioning the truth of the statements within the text. This may be reflective of their processing ability. It seems that they are capable of monitoring their comprehension, but perhaps not with the internal consistency standard. In order to use this standard, one must combine several strategies at once: encode and store meanings, activate sentences simultaneously in working memory, compare sentences, and frequently make inferences (Markman, 1979). In an earlier study, Markman (1979) had found that memory was not a significant factor in older elementary school children's ability to detect inconsistencies. When asked to repeat passages they had listened to, even the youngest children would repeat the inconsistent statements and respond that there were no problems. It seems then that children are able to store text in working memory, but that the higher order cognitive processes that are necessary for noticing internal inconsistencies are not applied.

The final semantic standard of evaluation is that of informational clarity and completeness. One must apply this standard in order to determine whether or not the text includes enough information for a given task to be completed or for a concept to be understood. Research in this area

often examines the clarity of a set of instructions. A study by Flavell, et al. (1981) was described earlier in relationship to the propositional cohesiveness standard. Children who listened to directions for building with blocks were unaware that the directions were ambiguous and incomplete. In a similar study with children, Markman (1977) found that age had a significant effect on a child's ability to realize that directions were incomplete. Children aged six years to eight years old were given instructions that were purposely incomplete for playing a card game and for performing a magic trick. The children were specifically instructed to listen for inadequacies. She found that the older children were more likely to notice that the information was incomplete than the younger ones. Often, the younger subjects actually had to attempt to complete the task before they realized it would be impossible with the given set of instructions. Markman suggests that the young children were processing at a superficial level as rather passive learners. They were not actively trying to mentally execute the directions or to integrate them. Neither were they making the inferences that would have been necessary to carry out the task. In a follow-up study, Markman found that when the children saw a demonstration of the task first, before they heard the instructions, they seemed more cognizant of the embedded problems. She speculated that perhaps the experimenter's demonstration

served to decrease the number of inferences that were otherwise necessary.

Baker (1985) also studied the informational clarity and completeness standard and found that it was used spontaneously by college students. They applied it when terms or concepts in the text were not adequately explained. Its frequency of use was followed only by the lexical and structural cohesiveness standards. The higher verbal ability students used it more often than those of lower verbal ability. This is indicative that better readers are less tolerant of superficial information and attempt to process text in more depth than poor readers.

The studies that have been reviewed suggest a close relationship between comprehension monitoring and current cognitive theories of learning and reading comprehension. It seems evident that a learner must see him/herself at the center of a cognitive task and be in control of a flexible set of strategies in order for successful comprehension monitoring to spontaneously occur. Several studies have shown that the ability to monitor is present even in young children, but that it often is not applied until explicit directions are given. Students may be so accustomed to having an instructor monitor their attempts at comprehension for them, that they do not take charge independently.

Also shown was the implied assumption by students that the text was the center of learning rather than the learner.

Older students in particular frequently did not apply an external consistency standard. Either they did not possess the prior knowledge, or they did not understand the active nature of their role as a comprehender. Younger students were much more likely to critically examine the truth of written text. Perhaps students become conditioned over the years to accept the written word as "correct". An unfortunate consequence of this is a rather passive approach to reading. Again, this relates to students taking charge of the task and realizing that comprehension is enhanced when material that has been stored in memory is activated and compared to text.

Macroprocessing

Relationship to Text Comprehension

As Kintsch and van Dijk (1978) describe their model of text comprehension, they refer to the structure of text as having two levels of meaning. The first level is that of a "microstructure", and it involves understanding individual sentences and how they relate to one another. Kintsch (1974) suggests that certain sentences act as superordinates in this network of sentences and are likely to be recalled two or three times more often than others. Within a paragraph, these sentences could be considered the topic sentences. The second level of meaning, which the learner must recognize, is called the "macrostructure". This level refers to the overall general meaning in the text.

Irwin (1986) has described macroprocessing, the procedure one uses to construct the macrostructure, as "the process of synthesizing and organizing individual idea units into a summary or organized series of related general ideas." Good readers distinguish the most important ideas in a passage and summarize them according to an appropriate organizational pattern. Irwin suggests that the major purpose of this activity is to enhance one's recall of the material by organizing it and by decreasing the number of ideas that need to be remembered.

According to Kintsch and van Dijk (1978) and Irwin (1986) then, the ability to process text on two levels is a necessary component of text comprehension. The reader needs to see the relationships between individual sentences and also to organize them into summary statements. An integral part of this process is distinguishing important ideas from those which are less important.

Relationship of Age to Recall and Identification of the Main Idea

One of the most commonly studied skills in reading research has been that of finding the main idea. It has frequently been considered in terms of the student's ability to recall important information from text. The early studies of Korman in 1945 indicated that "important" ideas tend to be recalled more than those that are less important.

A major criticism of his study, however, has been that "importance" was not well defined (Baker and Stein, 1981).

Christie and Schumacher have conducted several investigations (1975; 1976; 1978) with young children to determine whether recall is higher for "idea units" which are considered relevant to the main theme of a story than for those which are irrelevant. The generation of idea units enables one to specify more clearly what it is that the subjects are recalling. The experimenters organized story information into non-redundant sections which described either "1/ an event or 2/ a characteristic of an object or person referred to in the passage." The units were then rated on a five point scale for relevancy to the main theme by college students. One study (1975) done with kindergarten, second and fifth grade children investigated their ability to recall information as well as their tendency to keep the same order of ideas when reconstructing a passage which they had listened to. The results indicated that all age groups recalled more information that was relevant to the main theme and also that even the youngest children maintained the original order of ideas during recall when those ideas were relevant more often than when they were irrelevant. This would indicate that across age levels, children have a sense of theme and use it to organize ideas.

In another study (1978), the same investigators found that students' recall of prose passages was related to whether or not they received a contextual organizer for the material. First and fourth graders listened to passages, some of which were semantically ambiguous. When appropriate contextual information was provided, all subjects recalled more information. Evidently, even the younger children were able to utilize organization in order to store meaningful information. There was an age difference, however, in another aspect of the study. When given specific instructions that a memory task would follow the presentation of the passage, older students outperformed the younger ones. This led Christie and Schumacher to conclude that even though young children seem to recall meaningful material, they do not employ "deliberate strategies" with text as do older children.

A similar result was found in a study by Brown and Smiley (1978) where students were given extra study time and then tested to see if that time increased their recall of important facts rather than trivial information. They discovered that for those subjects in the seventh grade and older, the extra time did make a difference; however, the younger students apparently did not have a set of strategies that enabled them to process the text any differently even given more time. Consequently, their scores did not change significantly.

Danner (1976) conducted a study in which he manipulated the grouping of sentences in order to determine if this would have an effect on recall and also to assess children's understanding of topical organization and its effects. Each passage had three main topics and was presented in two formats: one where all the sentences which related to a topic were together, and another in which the sentences were not grouped together according to topic. Students from the second, fourth and sixth grades listened to taped versions of the stories and were then asked to recall the material and also to report what might have made some of the stories more difficult to remember. All children recalled more information from the organized passages. The results indicate, however, that awareness of the effects of disorganization increased with age although only two subjects specifically stated that the passages were more difficult to recall when they were not organized around a topic. Danner concluded that the students did not intentionally use organization to enhance recall and that they were not generally aware of its positive effects. He suggests that with the youngest children, the process is a passive one and that successful recall is more dependent on the material than on the reader, but that for the older students there is an active attempt at organization. In another study on the effects of topical organization on recall, Aulls (1975) found that sixth graders remembered

less after reading passages where sentences had been re-ordered.

Brown and Smiley (1977) also found that although students across grade levels seemed to remember the most important material, the younger students could not distinguish between levels of importance. Eighteen year olds were able to identify four levels of importance among idea units in folk stories. Twelve year olds could identify the most important and the least important, but not the two middle levels. The two younger groups of eight and ten year olds were unable to make any reliable distinctions. The investigators concluded that readers spontaneously attend to the main idea even when no "deliberate attempt to do so is instigated." It seems though that ability to directly attend to the main parts of text increases with age.

In a related study, Williams, Taylor and Ganger (1981) found that subjects were able to identify a general topic, i.e., the subject, for a passage more easily than the specific topic of discourse, i.e., the main idea. In the same study, although all ages performed better when there was an explicit topic sentence, the adults used it more effectively than the children did. Children did, however, use the topic sentence information when it was graphically highlighted in the text.

Another factor in the recall of the main idea has been suggested by Stein and Glenn (1978). When they asked first

and fifth graders to recount the three most important ideas from a story, the experimenters found that the two age groups conceptualized the main idea differently. The first graders focused on the "consequence of actions" while the fifth graders paid more attention to the "goals of the characters". This idea of differential conceptualization for the theme was also discovered by Winograd (1984) in his study of students' ability to write summaries (See page 58).

Baumann (1982) argues that much of the research surrounding the main idea has reached different conclusions depending on what procedure has been employed. He feels that studies in which the subjects listen to material rather than actually read it has had significant effects on many of the reported results. He cites the work of Dunn, Matthews and Bieger in 1979 and Tierney, Bridge and Cera in 1978-1979 where the students read silently rather than listened to material. Both of these studies found little relationship between the importance of material to the topic and what was recalled later. Baumann (1981) conducted a study with third and sixth graders in which they silently read expository passages. He also found that there was no consistent pattern of better comprehension for main ideas than for details.

Relationship of Reader Ability to Ability to Summarize

While investigations into the recall of text provide data on what type of information the reader attends to, researchers have also studied the reader's ability to strategically process content. One such active process which allows us to see the reader's ability to organize information hierarchically is that of summarizing. In order to summarize text adequately, the reader must do more than recall all the information. According to Brown and Day (1978), he/she must make "judgments concerning what elements to omit or include". Jolly (1974) reports a study done in 1959 by William Perry at Harvard University. He told 1500 freshmen to read a textbook chapter and to be prepared for a text on it. The students then took a multiple choice test for which their scores were excellent. Following that, he asked them to write a short summary of the chapter, but only 15 students could do it. Baumann (1981) also studied third and sixth graders' ability to read passages from a social studies text and then to write a "gist statement" of the material. He found that only 30 percent of the third graders and 40 percent of the sixth graders could produce one.

Brown and Day (1978) also measured the ability of students across grades to write summaries of folktales. The students were given the stories to learn and were then asked to recall everything they could. Only those who were able

to remember 80 percent of the information at each level of importance were subsequently requested to write summaries. The findings indicate that high school and college students were more sensitive to levels of importance than were fifth graders. The fifth graders, however, when told to shorten their summaries did drop the information from the lower levels of importance.

Brown and Day identified a set of six rules for summarizing text (1978). They are similar to the macro rules for processing text that were included in Kintsch and van Dijk's comprehension model (1978). The first two rules refer to deletion of material from text. The reader needs to delete both trivial and redundant information when summarizing. The next two rules involve superordination which refers to the reader's ability to substitute one general term for a list of items or actions. The fifth rule is selection, and it relates to the reader's ability to identify the author's topic sentence if there is one. This leads to rule six, invention, where the reader must construct his/her own topic sentence for the material because the author did not include one.

In a study designed to diagnose where problems occur in the summarization process, Brown and Day (1978) re-constructed passages from a geography text so that five of the six rules could be used in preparing appropriate summaries. Given a population of students from the fifth

grade, seventh grade, tenth grade and college, the experimenters found that across grades, all students were able to use the deletion rule effectively. Even fifth graders experienced no difficulty in eliminating information that was redundant yet important to the topic of discourse. The appropriate usage of the superordination and selection rules increased with age. The invention rule was significantly used only by the college students and then only half of the time was it applied appropriately. Brown and Day concluded that the rules, "demand differing degrees of cognitive manipulation". They suggest that where the rules differ the most from those already employed by students, there will be the greatest difficulty. For instance, it was their observation from an earlier study that younger students take the following steps to summarize:

1. read the text elements sequentially,
2. decide for each element on inclusion or deletion,
3. if inclusion is the verdict, copy it more or less verbatim from the text.

Clearly then, the rule of deletion comes the closest to a strategy that young students readily associate with summarizing text. Superordination implies not only the deletion of material, but the synthesizing of related pieces of information into one conceptual term. This requires considerably more processing than simply deciding what to

eliminate. The rule of selection assumes that the reader understands the value of a topic sentence and that he/she has identified it as a superordinate in the network of sentences. The invention rule, like the superordination rule, requires that the reader first construct relationships within the material and secondly produce a sentence that represents the overall topic of discourse.

These differences in cognitive demands were again demonstrated in a study with community college students. (Brown and Day, 1978). While they used the deletion rule effectively, the students were not able to apply the rules of selection and invention. Their performance in these areas was comparable to that of seventh graders in an earlier study.

Winograd (1984) studied the strategy differences between good and poor readers at the eighth grade level for writing summaries of expository text. One of the variables of interest was the subject's awareness of the task demands for summarizing. The results indicated that 69 percent of both good and poor readers understood that including the main ideas was the most important consideration. Good readers, however, were better able to find the important ideas in the passages than the poor readers. The poor readers were consistent in what they considered important, but it did not correlate positively with the main theme that had been identified by good adult readers. Another finding

of the study indicated that even though the poor readers verbalized that the main ideas were the most important ones to include, they did not include those which they rated important when they actually prepared their summaries.

Winograd established scoring criteria for the summaries that differed somewhat from those of Brown and Day, but the results are similar. He looked at the following strategies: reproduction, combinations, run on combinations and inventions. The reproduction strategy refers to attempts to simply copy or paraphrase material from the text. Writing combinations is the student's attempt to effectively combine and reduce two or more sentences. Run on combinations result from an inappropriate attempt to combine information. The invention strategy is the task of actually producing a sentence that reflects the overall meaning of a portion of the text. Winograd found that the good readers had fewer reproductions and run on combinations in their summaries than did the poor readers and also that they effectively included more combinations and inventions. These results support those of Brown and Day.

Among Winograd's conclusions from his study is that the ability to identify the most important parts of a text is a strategic skill that underlies both comprehension and summarizing. Indeed this seems to be supported in the research on both recall of text and summarization of it. It

also follows directly from the propositions advanced by Kintsch and van Dijk in their model of text processing. The goal of reading according to them is to produce a representation of the text based on actively constructing a network of the individual sentences which are then organized in a hierarchical structure which reduces the information to be recalled according to the level of importance.

Macroprocessing Instruction

Research on both the ability to recall text and to summarize it indicates that to be successful, a reader must recognize the hierarchical structure of text. Kintsch and van Dijk suggest that the reader must first identify superordinate sentences and then organize the remaining content into a relevant framework. Winograd and Bridge (1986) contend that successful readers identify important ideas through the interactive use of two strategies: they are able to use the author's textual cues, and they are able to use their own experience with types of text and topic knowledge. If these are the underlying tasks in macroprocessing, then they should be reflected in instructional techniques which address main idea and details.

Johnson and Barnett (1981) found that finding the main idea and supporting details is the most frequently presented comprehension activity in four basal readers and the most frequently recommended in five reading methods textbooks. This emphasis is not new but has been an accepted goal of

reading instruction since the 1920's (Cunningham and Moore, 1986). The concept of main idea and the methods employed in teaching it have, however, varied considerably. Ladd found in a survey of reading professionals (1983) that 100% of them agreed that main idea could be stated in more than one way. Winograd and Brennan (1983) surveyed teacher's manuals from two basal series for grades one, three, five and eight. They discovered a great deal of ambiguity surrounding the definition of main idea and topic. Not only did the sequencing and grade level differ for instructional presentation, but the distinctions between the two terms were often unclear.

In response to the various interpretations that have been given to the concept of main idea and the subsequent instructional practices, Cunningham and Moore suggest several guidelines for instruction. First, students need to understand the distinctions between the different types of main idea tasks and what is expected of them. Cunningham and Moore have identified nine possible tasks including producing the gist, a topic issue and a topic sentence. They contend that these responses, while differing greatly, are all appropriate to the identification of the main ideas. Secondly, in their instructional guidelines, they propose a "faded instruction" technique where students are given a main idea model and through a three stage process are lead to generating a particular main idea response. They contend

that much basal reader instruction lacks this active strategy. A third guideline emphasizes the importance of distinguishing the reader's purpose from the author's purpose. The reader may need certain information from the text and, thus, needs to highlight particular aspects of it while the author's organization may reflect a different emphasis. This relates to van Dijk's concept of information being textually important as opposed to contextually important. He defines information that is central to the author's theme and usually that which an instructor emphasizes, as textually important. On the other hand, information is contextually important according to the reader's personal interests and needs. van Dijk (1979) contends that good readers recognize this distinction and are able to apply criteria appropriately. It seems apparent that this difference should be made explicit to the student during instruction. The final guideline contains a recommendation that instruction proceed from simple main idea tasks such as finding a key word which labels the most important concept in a passage to more complex responses such as determining the gist or summarizing a passage.

Aulls (1986) argues that students need both a declarative knowledge (knowing what a strategy involves) and a procedural (knowing how to apply a strategy) knowledge of the main idea concept in order to determine the importance level of text information. He feels that students, starting

in the middle grades, should be taught how to "identify, infer and generate main ideas" before they are expected to apply reading study skills such as underlining, memorizing or summarizing.

Aulls further recommends that main idea instruction be more context free than context bound. (1986). Students are less likely to transfer a skill that has been learned in a restricted format (context bound) because they become dependent on that format to cue their response. For instance, if instructional exercises for inferring the main idea are always in a multiple choice format, the student who has seemingly mastered the skill may not be able to write out a main idea statement when multiple choices are not provided. On the other hand, if the main idea skill is context free, the student will be able to determine the main idea across different types of materials and will be able to use the skill spontaneously. This gives the reader more flexibility by creating a repertoire of strategies to apply in various instances, e.g., varied placement of topic sentence, familiar vs. unfamiliar content. A related advantage to such a repertoire is that it encourages the student to be more aware of the process for finding the main idea. Subsequently, he/she is better able to monitor success while reading.

Having a context free strategy for recognizing the main idea across texts implies that students must have

access to a set of rules. Aulls feels that teaching such rules is important because they "enable deliberate mental activity which leads to an end result or product". Studies by Day (1981) and by Ritchie (1983) seem to reinforce this. In Ritchie's study with sixth graders, he found that by teaching rules for identifying topics and main ideas students were better able to ask questions regarding the main idea than those without such training.

A related instructional technique that is recommended by Winograd and Bridge (1986) is one which involves the students in generative tasks. Rather than simply responding to questions, the students are expected to generate summary statements about the text. Bridge, et al. (1984) found that less proficient adult readers scored as well as good readers on a free recall post-test when they had generated main idea sentences for each paragraph during the initial reading. Several studies (Doctorow, Wittrock and Marks, 1978; Taylor and Berkowitz, 1980) have shown similar results. Bridge, et al. contend that this type of task may benefit poor readers by forcing them to integrate information and then to produce a main idea. This is an active process which is spontaneously employed more frequently by good readers.

Hare and Bingham (1986) also recommend using generative activities rather than simply recognition exercises to improve basal reader instruction in identifying main idea.

They feel that poor comprehenders strategize more on how to eliminate multiple choice options than they do on the process of finding the main idea. Moreover, when students are required to generate a response, the teacher can evaluate and consequently remediate more specifically the mental process that is being accessed.

An example of a generative sequence that has been developed by Hare and Bingham has been labeled Discovery Lessons. Two of the goals in this sequence are for students to recognize that texts have hierarchies of ideas, not necessarily one main idea and to distinguish textual from contextual levels of importance. The authors assume that students enter school with a basic understanding of narrative organization and that by leading them through a process of "blueprinting" this organization, students will subsequently be able to blueprint the hierarchy in expository text. Indeed the research seems to support this notion. Bridge and Tierney (1981) worked with third graders and found that they recalled well-structured narrative better than they did expository material. Another study done by Boljoris and Kaye in 1980 found that fourth graders were able to recall information from narrative text better than the same information presented through expository text (Winograd and Bridge, 1986).

Hare and Bingham recommend teaching each organizational pattern for expository text separately. By learning the

various text structure cues used in different patterns, they feel that students will be able to more effectively identify the main ideas. Although there has been more research done on main idea identification in narrative text than in expository text, it has been suggested that good readers know the organizational patterns of expository material and use this knowledge to comprehend (Meyer, 1979).

Enlert and Hiebert (1984) found that high ability third and sixth graders were able to identify expository text patterns (sequence, comparison-contrast, description and enumeration) better than low ability students. They also found developmental differences depending on the organizational pattern. Third graders were best able to identify sequence and had the most difficulty with description and comparison-contrast.

Hare and Bingham suggest the direct instruction of these typical expository structures to students (1986). Students should learn to look for such structures and to provide one if it is not apparent. They further suggest that instruction could include the provision of a map for students which represents the informational hierarchy in the text. Students would then read to fill in the explicit information called for in the hierarchy which would in turn lead the student to recognition of the top level ideas. Barnett (1984) also suggests that students use this

knowledge of organizational patterns in macrostructure to find the main idea.

Hare and Bingham (1986) emphasize that instruction in text structure be conducted in unpredictable as well as in tightly organized text. Students must be taught directly how to transfer the skill of finding the main idea from workbook exercises to actual textbook material where one organizational pattern is often combined with another and not as readily recognizable. Hare and Bingham refer to this as including "functional reading activities."

Instruction provided by Williams (1986) on finding the main idea purposely included anomalous sentences in order to prepare students for "natural text" which is not always well structured. She based her instruction with middle school age learning disabled students on their prior knowledge of classification skills. Her premise was that there is a relationship between classifying objects and providing superordinate labels for words, phrases and sentences and identifying general and specific topics in paragraphs. Rather than using the term main idea, Williams taught children to find the general topic and the specific topic through a sequence of questions. In an evaluation study where she compared those receiving such instruction to those who did not, she found the instructional group was better able to write summary sentences of text and also to identify anomalous sentences.

Aulls (1986) asserts that students must be taught to distinguish a topic from a main idea and that these two concepts can provide helpful signals to the reader in terms of importance level of information. In addition, he feels that topic identification should be taught first since children are better prepared cognitively to understand it. He cites several cognitive developmental studies, Baker and Stein, 1978; Nelson, 1977a; and Stein and Glenn, 1979, which claim that students are able to organize semantic concepts before they are able to understand more specific "text structure signals" to main idea statements.

Afflerbach and Johnston (1986) studied the strategies employed by expert readers and found that they first stated a topic as they tried to identify the more specific main idea. Topic identification seemed to be a preliminary step that led to the main idea through a process where the reader eventually qualified the topic with a limiting comment. Their study showed that good readers used this strategy after reading a paragraph rather than proactively applying it before reading. They recommend that main idea instruction include having students use the strategy as a pre-reading strategy or during reading by skimming to first locate a topic and then reading more thoroughly to produce a qualifying comment that represents the main idea.

The literature on main idea instruction indicates much variation not only in presentation techniques, but in the

conceptualization of the term itself. The inability of poor readers to recall and/or summarize written material may be directly attributed to this confusion. While good readers may intuitively generate main idea statements, poor readers may become bound to the multiple choice identification format that is so frequently used in main idea instruction. This context bound format may preclude a poor reader from understanding the process that is involved in main idea identification. If the concepts, topic and main idea, are used interchangeably by the teacher, the poorer reader may never make the distinction between them and will consequently be confused regarding text structure. It also seems that children are better able to understand topic than main idea. Instruction then should begin with strategies which lead to topic identification and then at a subsequent point, main idea could be introduced. Since children learn to classify objects at a young age, it has been suggested that this technique be related to the reading process where details are subsumed under a main idea label. It has also been recommended that since most readers come to school with a sense of narrative text organization, that instruction first reinforce this organization and then transfer it to expository text.

Perhaps the most important recommendation in main idea instruction is that which urges generative tasks. By generating main idea statements rather than simply recogniz-

ing them, the student is forced to actively process text and it is only when such an active strategy is employed that a reader can begin to monitor his/her success (Winograd and Bridge, 1986; Bridge, et al., 1984; Doctorow, Wittrock and Marks, 1978; Taylor and Berkowitz, 1980; Hare and Bingham, 1986).

Direct Instruction

Relationship to Reading Comprehension Instruction

Durkin has conducted three studies (1978-1979, 1981, 1985) which indicate the paucity of direct instruction as it presently exists in reading comprehension in the classroom. The results from her work highlight ". . .the widespread confusion between teaching and testing comprehension." She examined current, popular basal readers, reading methodology textbooks and also observed in 39 elementary school classrooms. In the classroom observations (1978-1979), she found that one percent of the overall time was spent on teaching comprehension while 33 percent of the time was devoted to distributing and assessing comprehension assignments. When she subsequently analyzed basal readers (1981), the results were similar. Suggestions for explicit teaching were minimal, but testing recommendations were prevalent. A further finding revealed that these procedures for assessment were actually labeled "instruction". She concludes that "one undesirable consequence of the persis-

tent failure to make a distinction is that children are often tested on what was never taught."

In Durkin's observations, she defined direct instructional activities as those in which the teacher interacted with the students about how one goes about doing comprehension tasks (1978-1979). Historically, however, direct instruction has had a slightly different emphasis. Rosenshine (1976, 1979, 1980) and Berliner (1979) described two components which have been considered highly correlated with reading achievement. The first of these is "engaged time". This concept led to many time on task studies where classrooms were observed in order to determine exactly how much time students spent on given assignments. The crucial aspect here was that students were attending to task in a particular subject rather than spending unstructured time. The task was rarely analyzed and could be either one of assessment or simply drill. The second component is that of "teacher monitoring". This included: directive teaching, repetition and drill and individual feedback to the students (Duffy, 1981). These components contributed to a setting in which learning was organized and controlled by the teacher in a fairly mechanical way. The emphasis was on teacher management of learning. It seems evident that this is a prerequisite to learning, but that there must be more.

A more recent focus for the direct instruction of reading has been on the mental processing that is required

of students. According to Duffy, Roehler and Mason (1984), this goes beyond simply providing an "opportunity" to learn as the earlier model implied. They suggest that the instructional content be a metacognitive one where the student is told not only how to use a strategy, but why one would use it. A direct link must be made between the cognitive processes and the activity of reading. This implies a more proactive approach by the instructor and the student. The teacher must be aware of the function of the skills being taught and also of the mental processing that accompanies them (Duffy, Book and Roehler, 1985), and his awareness must be communicated to the students.

Roehler and Duffy (Duffy, Roehler and Mason, 1984) define this concept of direct explanation as ". . .making explicit the implicit principles and algorithms which govern successful comprehension rather than merely providing practice opportunity and corrective feedback to errors." In order to distinguish more clearly between their concept of direct instruction and earlier ones, they conducted two studies. The first consisted of observing two teachers who had been characterized as using direct instruction in their classrooms. Many similarities were noted: considerable amount of time on task was given students; students were grouped by ability for reading; and both teachers were very humanistic in their interactions with students. There were, however, discernible differences which distinguished the

lessons being taught. These distinctions were summarized by Roehler and Duffy as: the amount of talk found at the beginning of the lesson as opposed to the end of the lesson, the content of the talk patterns, the internal flow of the lesson, and the connection of one lesson to other lessons. While one teacher focused her "instructional talk" on how to complete the worksheet, the other teacher explained the mental process that was involved in the comprehension task being taught, how to use it, and how it actually related to connected text. The first teacher did not vary the amount of talking she did in comparison to the students, but with the second teacher, the amount of teacher talk decreased as the lesson progressed enabling the students to assume more responsibility for learning. The researchers concluded that the traditional model of direct instruction was indeed being followed by both teachers because both were providing much opportunity for the students to learn. There were, however, two distinctly different kinds of instruction being carried out, and Roehler and Duffy characterized this difference as the use of direct explanation.

A second study was then designed to examine the effectiveness of the direct explanation component of instruction. Specifically, they wanted to see if there was a relationship between the explicitness of an explanation and achievement for a low reading group. They also measured how the explicitness affected the students' awareness of

what had been taught. Teachers were rated for explicitness according to the knowledge they presented regarding the mental process of a strategy and also on the means they employed for presentation. The knowledge aspect was assessed by the following criteria:

1. their talk about the mental process
2. their talk about why the process was useful
3. their talk about the salient features of the task and how they are used in the mental processing
4. their examples of how to do the mental processing

The means aspect was assessed by these six criteria:

1. the extent to which the processing was modeled
2. the extent to which they focused the students on the salient features
3. whether they consistently helped the students focus and when necessary, refocus
4. the extent to which they provided a review
5. the appropriateness of individual practice after the presentation
6. the degree to which students were helped to make application to connected text

The results indicate that there was an increase in reading achievement as measured by the comprehension subtest of the Woodcock Reading Mastery Test based on the explicitness of

the teacher explanation. Also students were more aware of what they were learning under the explicit conditions. This was measured by student statements regarding what they learned, why it was important and how to do it.

Roehler and Duffy (1981) suggest that effective teaching requires two dimensions. The first is a proactive one, and it implies that the teacher accepts the responsibility for explaining a task before making an assignment. The second dimension is the reactive role where the teacher accepts responsibility for the students' failure to understand and continues to actively assist in the learning process. It is more spontaneous than the proactive component, but differs from traditional instruction in that the teacher doesn't put the responsibility for failure on the student. He/she consistently maintains a learning environment until the student(s) is able to successfully complete appropriate practice exercises. This concept is further supported by Kameenui (1986) who contends that the Direct Instruction Model presumes that all children are capable of learning any concept and that if the student fails, "the failure is not with the learner but with the instructional episode."

Brown (1982) reports that very few learning strategies are "incidentally" acquired without explicit training. She relates Vygotsky's internalization model to the process by suggesting that when teachers initially monitor students,

they are making certain regulatory activities overt and explicit to the learner. She continues by noting the relationship of Fuerstein's concept of "mediated learning". The teacher, acting as a support person, comes between the learner and the environment and "intentionally influences the nature of the interaction". This subsequently allows the student to gradually assume his/her own regulatory strategies. The teacher then has acted as a model in an intentional and explicit manner.

Clark (1986) applies the concept of process modeling even more explicitly. He suggests that currently the emphasis in the classroom is too "product related". In other words, students read and are then questioned on the content. His emphasis focuses on process where the teacher can contribute to comprehension monitoring by reading aloud to the students and commenting simultaneously. He refers to this as "verbal monitoring". The teacher verbally makes a hypothesis about the passage and revises and evaluates as he/she reads it aloud. To be most effective, he/she should incorporate mistaken judgments. Following this, the students participate in a similar process with the teacher assisting, and finally they apply the whole procedure independently.

Johnston and Byrd (1983) suggest that a distinction must be made between improving children's comprehension and the ability to comprehend. In other words, strategies must

be provided during instruction which students will use when the teacher is no longer present. They contend that students must be explicitly given a goal or reason to use any strategy that is presented. Without this concept of "goal-directedness", students will not become self-monitors and consequently will not independently adapt learned strategies to connected text. Johnston and Byrd analyzed teacher manuals for basal readers to see if this strategy approach was included. They looked for instructional examples which combined: a non-immediate goal, a structured approach, a causal relationship between the strategy being taught and comprehension and a self-monitoring component. They found that none of the manuals combined all the components for any example. They concluded that ". . . children are not informed participants in their instruction in any of the programs".

Brown (1978) concurs with this and suggests that it raises the question of whether or not to train for an "executive control" of skills rather than for specific skills. Referring to current instructional practices, she comments, ". . . why should they then be expected to use their new skills insightfully if the reason for the activity was never made clear?" She further explains that the long term goal of cognitive instruction should be to create a general improvement in understanding which is more difficult than specific skill instruction. In the case of reading,

this would refer to ensuring that the students understand the overall nature of the reading process and how the individual skills fit into that process. Brown notes that mature learners can often make these generalizations spontaneously, but that for immature learners, direct instruction in generalizing must be presented along with specific rules that are taught. She suggests that students first be taught how to use and maintain a given strategy and secondly how to apply it in a more generalized manner within an overall process.

Brown, Campione and Day (1981) contend that when students are explicitly taught to "employ, monitor, check and evaluate" their learning, not only is performance enhanced, but transfer of learning is more probable. They report that historically much instruction was given that fostered rote recall. Students were not told of the significance of what they were learning and, consequently, little generalization or transfer took place. In their study with mildly retarded children, they concluded that cognitive training should explicitly inform the learner of the significance of what is being taught and also that self-management must be included as a component.

It is evident that the concept of direct instruction must be applied beyond the framework of simply providing students with the opportunity to learn. Certainly the teacher must manage the learning environment, but this is

only the beginning. Responsibility for learning must gradually be released from the teacher to the student and in order for generalization or transfer to occur, the student must understand the significance of what he/she is being taught. The mental process which underlies the individual skills must be explicitly modeled for the student by an instructor who has critically examined the skills and can explain how they tie into the whole.

Specific Instructional Strategies and Models

Many models have been proposed for the implementation of direct instruction in the classroom. There are, however, certain criteria that seem to be characteristic of them all. The following set of guidelines combines and paraphrases those suggested by Baumann (1986) and Brown, Campione and Day (1981) for the teaching of reading comprehension.

1. The skill must be made relevant.
2. Instruction must move from simple to complex.
3. There must be knowledge of where breakdowns occur.
4. There must be adequate time given to instruction where the students are attending to and engaged in the activity.
5. There should be explicit instruction regarding how and when to use the strategies.
6. Feedback must be provided during discussion as well as for independent practice.

7. A variety of material should be used for practice to facilitate transfer.
8. Self-checking strategies should be included in the instructional component.
9. The instructional period should be followed by massed practice of the skill.

Baumann utilized these basic procedures when he designed a research strategy for teaching anaphora (1986). The instructional design reflected a gradual shift of responsibility for performance from the teacher to the teacher and student and finally to the student alone. Baumann notes that this gradual shift allows for internalization of the new skill and also facilitates the transfer of learning and the ability to apply the skill independently. He implemented four steps in his instruction. The first two were the sole responsibility of the teacher. An introduction and example of how to apply the strategy were given as well as an explanation of why the strategy was useful. The second step included a direct explanation of the strategy. This component is highly structured and the teacher is the center of learning as he/she explains and models the relevant task. For the third step, the student moves into the center along with the teacher in order to practice the skill and receive constructive feedback. There may be some re-teaching here and although the teacher should have anticipated where the breakdowns could occur, this component

is more spontaneous than the earlier ones. Baumann recommends the use of "natural passages" and increasingly longer ones at this stage in order to facilitate transfer. During the final step, responsibility has shifted from a shared center to the student alone, and independent practice then takes place.

Irwin (1986) has proposed a similar model for direct instruction which she labels, EMQA. Again, there is a shift from teacher-centered activity to student-centered. The teacher begins with an explanation/introduction of the skill to be taught and then proceeds to a modeling component. During the modeling stage, the teacher provides verbalization to the students of the mental processes that he/she engaged in while applying the skill. Irwin emphasizes that for the third component, questioning, both process and product questions should be asked. Process questions are those that ask the student how he/she is using a strategy while reading. By including questions that relate to the mental processes that are occurring while the skill is being applied, the importance of how to use the skill is highlighted. This prepares the student for the last step of independent activity which should include a certain amount of self-monitoring during the task rather than simply at the end.

Tierney (1985) concurs with the cited models for direct instruction and emphasizes that the focus should be

to make students aware of the strategies which can be transferred to independent reading situations. He suggests that the general features of all explicit instruction in reading should include: a statement of relevance; a definition of the skill which includes how to apply it, modeling, its usefulness, and demonstration of what it is not; guided practice; self regulation; a gradual shift of responsibility to the student; and application. He notes that with this method, teachers must be careful not to be too restrictive and inhibit the self initiation of strategies by students.

Another model which incorporates the elements of direct instruction has been suggested by Beyer (1985) for the teaching of thinking skills. Beyer proposes a framework with five stages which begins with having the students select examples of a given skill and then focusing their attention on the results of its application rather than on its nature. He feels that this develops a readiness in the students for specific instruction. This is followed by an introduction and step-by-step demonstration of the components of the strategy. Next, there is a series of guided, instructional practice sessions which include explicit references to the skill being studied. Then a lesson is included where the skill is presented through different materials in order to enhance transfer, and finally opportunities are provided for additional practice with

feedback until the students can ". . .initiate and employ the skill and evaluate their use of it." Beyer feels that the introduction is the most important stage in the process because this is where the teacher highlights the attributes of the skill to be learned and makes it a subject of "continuing and conscious attention" for the students. Beyer also suggests that the time to introduce a skill is when it is needed to accomplish a content-related task. By using such a context, the student's motivation is enhanced because the relevance is immediately discernible. Another recommendation is to include guided practice continuously throughout the instruction. Beyer feels that this becomes "reflective skill practice" and enables the students to not only become more aware of the mental processes involved but also enables them to gain some conscious control over them. He describes the following criteria for students to apply during this component:

1. Verbalize the expectations they have for using the skill;
2. Describe the process involved in using it;
3. Predict the results of its use;
4. Check the steps involved as the process is occurring; and
5. Evaluate the actual outcome.

The designs for direct instruction have all included a modeling component. Davey (1983) suggests that the major

instructional focus related to this is "to enhance a meaning orientation to print" for poor comprehenders. She conducted a study where the instructor verbalized her thought process as she read a contradictory, ambiguous passage to students. As she read, she emphasized the following mental components: making predictions, forming mental images, using prior knowledge, monitoring comprehension by verbalizing confusions, and subsequently applying fix up strategies. The teacher explained not only how to use the various strategies, but why and when they should be applied. Following this modeling, the students were paired to undertake a similar process, and then they were given the opportunity to complete it independently. During the independent phase, they were given a checklist to complete to ensure that the process was being followed. The results after three weeks indicated that the readers' attitudes toward reading as well as toward themselves as readers had improved.

Palinscar (Duffy, Roehler and Mason, 1984) has further highlighted the modeling component with the specific technique of reciprocal teaching. She conducted research to determine the effects of this procedure on poor comprehenders' ability in four areas: question generating, summarizing, predicting and clarifying. The reciprocal teaching model that she employed included explicit instruction, modeling and corrective feedback. The component that was highlighted, however, was ". . .an interactive dialogue

through which the teacher explicitly modeled the four activities previously described." During each instructional session, either the researcher would lead the discussion on the assigned reading or a student would be chosen to lead the group. The student teacher would lead the discussion based on prior modeling by the researcher. During such a session, the researcher would provide prompts as well as corrective feedback to the student leader.

In one of the studies based on this method (Palinscar and Brown, in press), reciprocal teaching was compared to the traditional reading activity of having students answer questions and then refer back to the text to correct errors. The results showed that reciprocal teaching led to not only better performance, but better maintenance of the performance than did the traditional method. In a follow-up study (1984), Palinscar and Brown looked only at the effects of reciprocal teaching for the same four activities and found that students' accuracy on comprehension questions increased from 40% to 70% after 15 days of instruction. More specifically, they determined that the students were more successful in applying the rules of summarization, identifying material that teachers often question, constructing clear questions and detecting anomalies in text.

It seems evident that although various models of direct instruction have been designed, they all incorporate similar procedures which focus on the gradual shift of

responsibility from teacher to student and also on increasing student awareness of the mental processes that need to be engaged in order for the successful use of a given strategy.

The Results of Specific Strategy Training

The effects of direct instruction have been studied in several areas of specific strategy training. One of these areas is that of teaching students to generate questions. This is often considered preliminary to comprehension monitoring. One such study by Palinscar (Duffy, Roehler and Mason, 1984) which has already been reviewed, showed that seventh graders who were taught to develop their own questions through teacher modeling and feedback increased their comprehension scores and also continued to use the strategy in subsequent classroom situations. In another study, Nolte and Singer (1985) trained nine and ten year olds to ask their own questions before, during and after reading stories. Through teacher modeling, the students learned what kinds of questions to ask. As they read silently, the teacher would intervene with appropriate questions. This teacher input was gradually phased out until the students were asking questions on their own. After ten days of training, the students were compared to a control group who had been instructed in a more traditional comprehension-product model. The experimental group significantly outperformed the control group on a comprehension

measure as well as on a test of transfer assessment. Similar results have been found in other studies (Helfeldt and Lalik, 1976; Andre and Anderson, 1979; and Weiner, 1978).

McFeeley (1984) designed a study in which fifth and sixth graders were given direct instruction in recognizing and asking literal, interpretive and critical questions. Each type of question was taught within a similar framework which progressed from teacher directed to student centered as the stages of modeling, guided practice, unguided practice and independent application formed the sequence. During the modeling stage, the teacher not only asked and answered the questions, but found the proof for the answer in the story and provided a rationale for it at the inferential and critical levels. The results indicated that the trained students asked significantly more questions beyond the literal level than did the control group.

Another area in which the use of direct instruction has been explored is that of identifying the main idea of a passage as well as being able to summarize it. Baumann (1983) used a direct instruction paradigm to teach sixth graders to identify the main idea. His paradigm was composed of the following steps: introduction, example, direct instruction, teacher-directed application and independent practice. Through these steps, the children were taught to comprehend explicit and implicit main ideas in paragraphs and short passages and also to construct main

idea outlines for short passages. After two weeks of training, the strategy group was compared to a group who had received traditional basal reader instruction and to another group receiving vocabulary development work. The results indicate that the strategy group outperformed both of the other groups in ability to recognize implicit and explicit main ideas, supporting details and also to invent main ideas for outlining.

Brown and Day (1980) used four levels of instruction which varied in degree of explicitness for teaching junior college students to summarize. The first level was the least explicit and advised the students only vaguely to be concise when writing. The second level contained explicit instruction in the use of the five rules for summarizing, and the third level combined the treatments of the first two. The fourth level was the most explicit, and it involved direct instruction in the summarizing rules as well as detailed modeling of how to monitor their usage. The results of the study indicated that the best performance was always found for the rules plus monitoring group even in a delayed post-test and that insignificant improvement was made by the group given only vague directions. Another interesting finding of this study is that the higher ability students needed less explicit instruction than the lower ability students. The poorer writers needed very explicit training in order to reach the performance level of

untrained college students. Also, there was a distinction between those designated average and poor writers. Although these two groups did not differ on the pre-tests, the average writers benefited more from the training than did the poor writers.

A third area in which explicit instruction has been reported is that of making inferences. Hansen (1981) designed a study based on the observation that children answer literal comprehension questions more accurately than inferential questions. She administered three treatments to a group of second graders. The traditional group received the typical basal reader format of questions following stories. Of these questions, 80 % were at the literal level while only 20 % were inferential. The second group also read from basal readers, but with the literal questions eliminated completely. The final group received the traditional training, but with the additional strategy of pre-reading exercises which instructed them to constantly compare the text content with their own prior knowledge. They also viewed a model of comprehension where the process of relating new information to prior knowledge was emphasized. The results indicate that both of the strategy groups performed significantly better than the traditional group on both literal and inferential assessments. In a follow-up study, Hansen and Pearson (in press) combined the treatment of the two strategy groups into one group and

compared it to the traditional group. This combined approach did not significantly increase the performance of the good readers in relationship to the control group, but it did, however, have significant effects for the poor readers. The poor readers outperformed the control group on inference measures taken from the instructional material as well as from transfer passages. In fact for one transfer passage, poor experimental students who were reading at a 3.1 level scored as well as good control students who read at a 6.2 level.

Another study conducted by Gordon (1980) investigated the effects of explicit inference training with fourth graders. She compared the results of training over an eight week period for three groups: one receiving explicit inferencing strategies, one receiving language related activities, and one which received training in how to use prior knowledge and how to recognize text structure. The explicitly trained group outperformed the others on a post-test of inference items from the instructional stories. The high achievers from this group, but not the low achievers, also did better on a delayed post-test of inference items.

Raphael (1980) studied inference training in the context of providing strategies and self-awareness to fourth, sixth and eighth grade students regarding generating answers to questions. She trained the students to monitor

where their answers came from, text or prior knowledge, when generating answers to questions that were based on textually explicit, textually implicit or scriptally implicit information. She labeled the three response strategies: right there, think and search, and on my own for the students. She employed a direct instruction method of modeling, guided practice, independent practice and direct feedback. She gradually lessened the amount of feedback as the students followed the strategy of reading the text and the question, generating an answer and deciding which response strategy they had used when generating the answer. The trained students were then compared to a group which had received only brief orientation to the response categories. Significant differences were found with the trained students who showed increased knowledge of the task demands for different types of questions and more ability to evaluate their own behavior as well as to generate better responses.

The final area of strategy training with direct instruction to be examined here is that of self-monitoring during reading. Collins and Smith (1982) suggest that three steps be included in order to teach students the process rather than the product of reading. The first step is modeling in which the teacher reads aloud and interrupts him/herself once or twice during each paragraph in order to verbalize hypotheses (including incorrect ones), supply evidence for and against the hypothesis, express confusion

and doubts and express general criticism toward the author's style. During the modeling stage, students should be continuously asked for input in order to prepare them for the second step of student participation. At this point, the major responsibility for finding problems and generating fix up strategies shifts to the student. Now the teacher acts in a corrective role rather than one of a question generator. The final step is for the students to read silently and to find what is wrong with the text.

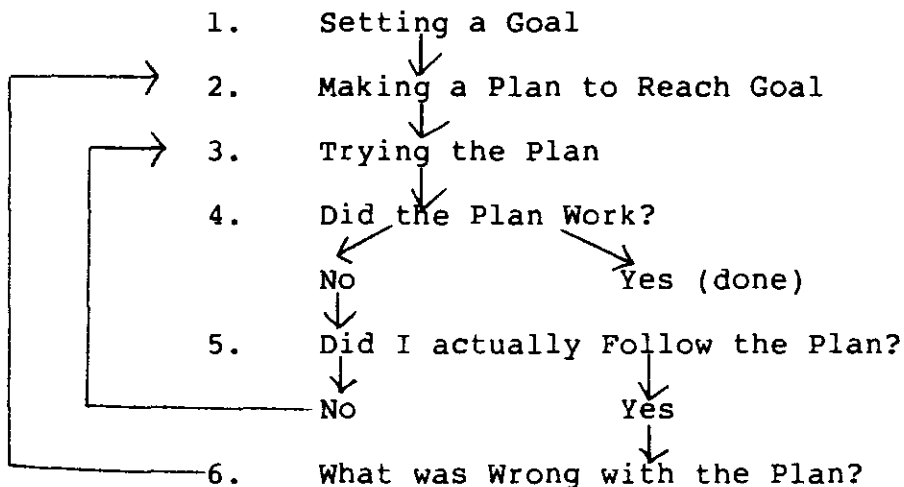
Heller (1986) reports a similar method for teaching comprehension monitoring skills in the content area which also revolves around the modeling component. She recommends that material be used that is already familiar to the students so that prior knowledge can be activated by them. Her method follows a traditional directed reading format that is organized around the three questions of, "What I already know", "What I now know", and "What I don't know" in relationship to the three stages of pre-reading, during reading and post-reading. She suggests that a chart be completed for all three levels of cognition and that the instructor first share with the class one that he/she has completed for her/himself. In order to do this, she cautions that the instructor must first be aware of his/her own metacognitive skills and must practice the verbalization to ensure consistently explicit explanations. Following the instructor's presentation, the students can form small

groups and take turns modeling similar behavior. The goal is to create independent comprehension monitors.

Belmont, Butterfield and Ferretti (1982) have conducted research in the area of transfer with subordinate cognitive skills which relates to self monitoring. They refer to "meta" knowledge which is the information one has about his/her own cognitive functions and the ways in which they can be combined when entering a new problem situation. This information is not sufficient without meta-processing, the ". . .superordinate function by which basic information processing mechanisms are organized to solve problems." This process allows one to transfer a set of learned skills from one problem situation to another. In order for this rearrangement to occur, Belmont, et al. recommend that students be directly instructed in a self-management strategy which includes six steps.

Figure 4

Self Management Strategy



Ryan (1981) also suggests a training sequence in which the goal is to "systematically lead subjects to where their own self statements guide and control their performance". She feels that teaching generalized strategies that can be applied across tasks is more important than learning "task-specific response sets". Ryan recommends following Meichenbaum and Asarnow's steps for self-instructional training:

1. Problem Identification and Definition (includes self statement, "What is it I have to do?")
2. Focus Attention (providing answer to step #1)
3. Self-Reinforcement
4. Coping Skills and Corrective Options

These steps should be taken across tasks to ensure generalizability. She cites a study by Bommarito and Meichenbaum where junior high students were trained using this method for six 45 minute sessions. Reading comprehension with a focus on critical thinking was divided into separate tasks for the students, and for each task a self-statement and cognitive strategy was generated. The experimenter modeled a set of self-statements which highlighted both frustrations and successes. The results indicate that the trained group not only significantly increased performance at the end of the training, but also maintained their performance one month later.

Meichenbaum stresses the importance of first analyzing the task into smaller units before proceeding with self-instructional training. By doing this, one is "deautomatizing" a process and only then can bad habits be eliminated and be eventually replaced with "automatic" effective behavior. Ryan also emphasizes the importance of direct training of one's executive functioning in order for generalization or transfer to be enhanced. Executive functioning includes strategy selection, monitoring and subsequent strategy modification.

This is also advocated by Brown and Campione (1979) who suggest that self-instructional training is most successful in regard to generalization when students are taught self-questioning strategies such as, "What is my problem?", "Am I doing O.K.". Brown, Campione and Barclay (1979) trained two groups of retarded adolescents to use such a strategy for studying for a test of recall. The subjects were to study until they could determine by self-checking that they were prepared for the test. The results show that not only was performance better than that of the control group, but that this effect was maintained one year later and was also transferred to another task.

A review of the literature indicates that there has been very little direct instruction traditionally applied to reading instruction. Instruction has tended to assess a student's skills rather than to explicitly teach them. Even

when skills have been directly explained, there seems to be an emphasis on the end product rather than the mental process involved in getting there. Direct instruction research results support the concept that readers must be explicitly taught functional skills as well as the underlying mental process and that both dimensions must be directly linked to the overall reading process. It is when students learn the significance of what they are being taught and are given a goal for learning a particular strategy that a transfer effect is likely. Various models for direct instruction have been identified, but the general criteria are similar: explicit instruction, verbal modeling and constructive feedback following relevant practice. The onus for learning falls on the instructional episode rather than the student, and consequently it must be carefully structured by the teacher. There must be a gradual shift in the responsibility for learning from the teacher to the student. Direct instructional techniques have been implemented for a variety of strategies and have been particularly successful with low achieving students.

Conclusions and Implications for the Present Study

For the purpose of this study, reading was defined as an active, strategic process in which the reader continuously applies strategies from a flexible repertoire. In order to apply appropriate strategies, the reader must understand the overall structure of text and establish a

clear purpose for reading. Using the Kintsch and van Dijk model for processing text, it is assumed that the mature reader is actively seeking relationships and looking for coherence as he/she reads. As the reader constructs coherence graphs, he/she is selective. The graphs reflect the hierarchical nature of relationships between sentences with a superordinate unit at the top, and irrelevant information discarded. The sets of sentences become integrated across an entire passage through the strategy of macroprocessing where the reader identifies a topic of discourse and is able to reduce all the separate elements to only the most relevant.

In order to process text, according to the Kintsch and van Dijk model, comprehension monitoring strategies must be spontaneously applied. Readers must apply more than one standard of monitoring as they read, and these standards will change depending on the reader's purpose for reading. Evaluation standards must be applied first, and they have been identified by Baker as lexical, syntactic and semantic. The semantic standard which consists of five subsets is most closely related to macroprocessing because its use requires the reader to check for overall meaning. The subset of interest to this study is that of internal consistency which requires the reader to access his/her short term memory and compare content across text. This ensures that statements

are consistent and assumes that the reader has that expectation of the text.

Readers must have a goal or purpose in mind when they approach text. Often this goal is to recall information presented. Since one's memory storage is limited, the reader needs to be selective with the material he/she chooses to store. The ability to reduce the information to its most relevant ideas is crucial to the task of comprehension. Indeed, the research has shown that relevant ideas are recalled more easily than trivial ones. When students must actively construct the main ideas through summarization, one finds that eliminating the redundant or irrelevant points is the easiest part of the task. Even the immature reader seems to know what material is not important to the theme.

The method of teaching by direct instruction has been shown to be very effective with cognitive processes such as reading. Where the goal is to create an independent learner who is capable of applying a generalized set of standards, the components of direct instruction are well matched. The primary elements of the method are presented in a framework that progresses from teacher-centered to student-centered with the transition between the two being a gradual one. The student does not become independent until the strategy has been explicitly described, modeled and practiced with corrective feedback. This procedure has not been tradi-

tionally found in the classroom where students are more often continuously assessed on a task which has never been directly explained. Indeed, the explicitness of the instruction has been shown to be an important factor in learning. Also important, especially with a cognitive process, is the verbal modeling by the teacher. Students can actually hear what should be going on in their heads during the process. The focus is on the process rather than the product, and consequently the nature of the process and the relevancy of the separate strategies become more evident. This enables students to transfer the strategy being taught more easily to various contexts.

It seems evident that the method of direct instruction could be an effective one for teaching macroprocessing. With an emphasis on process, a direct link could be made to the overall process of reading. This would ensure that the student understood the significance of the skills as well as their functional nature and would apply them independently across contexts.

As the student learns to look for the hierarchical structure of text that is involved in macroprocessing through direct instruction, then he/she should become more aware of the need to continuously test inter-sentence relationships across text. The student should then begin to spontaneously apply the monitoring standard of internal consistency.

CHAPTER III

METHOD

This chapter will present the major procedural steps taken during the present study. First, the experimental design and procedure will be discussed and summarized in an analytic paradigm. Second, the sampling population will be described. Third, the development of materials will be presented within the following sections: a brief rationale for and the initial development of the assessment measure, the field testing of the assessment measures and the resultant changes and the development of the instructional materials. Following this will be a description of the instructional procedures. Then the method of data collection will be outlined by describing the techniques used during the assessment sessions. Finally, the preparation of the data for analysis and the statistical treatment will be outlined.

The Experimental Design and Procedure

A simple two treatment randomized design was used for the study. Students were randomly placed in either the strategy (experimental) group or the traditional (control) group. All subjects were told that the instructional sessions had been designed to increase their ability to

comprehend expository text and that they would be tested at the end of three weeks to evaluate their ability. The students met with the experimenter in small groups of five, twice a week for three weeks. Each instructional session lasted approximately thirty minutes.

Subjects in the strategy group were given materials which explicitly taught them how to find the relationship of general idea units to specific idea units. Each session began with direct instruction of the skill being practiced, i.e., the instructor explained and modeled the cognitive process involved. The processes taught proceeded within the following order:

- a. identification of the stated relationship in word units
- b. identification of the stated relationship in phrase units
- c. identification of the stated relationship in sentence units
- d. identification of the stated relationship in short paragraph units

Subjects in the traditional group were given a series of short passages taken from a traditional reading textbook. After each passage, the subject was required to answer the six questions based on the passage content supplied by the reading text. Each question represented a specific comprehension skill which was identified for the subject.

The subject was instructed to check his/her answers with an answer key, note the skill areas in which he/she was experiencing difficulty, and then to proceed to the next passage.

Following the three week period of instructional sessions, students were individually assessed on their ability to use the internal consistency standard of evaluation to monitor their comprehension as well as their ability to identify the main idea. This assessment consisted of four passages. For each passage, the following procedure was used:

1. The student was given a purpose for reading. The task was to find the main idea and all supporting details.
2. The student was instructed to underline any portion of the passage which didn't "make sense" as he/she read.
3. After reading the passage, the student was asked to list the main idea and as many supporting details as possible. Students were allowed to re-read the material if necessary.
4. If the inconsistency was not underlined during reading, the experimenter probed the student by reading two sentences from the passage and asking the student to explain how each one fit into the overall message.

The design can be summarized in the analytic paradigm found in Figure 5. The hypotheses to be tested are listed below the paradigm.

Figure 5

Analytical Paradigm for Study

	Strategy Group	Traditional Group
Score on Assessment Measure		

Hypothesis One: There is no difference between treatment groups in ability to recognize inconsistent details within a given passage as measured by underlining while reading followed by probed questioning.

Hypothesis Two: There is no difference between treatment groups in ability to identify the central idea unit in a given passage as measured by the listing of the main idea.

The Sample

The total sample consisted of thirty college students from an ethnically diverse urban campus located in Chicago. All students chosen to participate in the study were

enrolled in Developmental Reading sections at the college, and were offered extra credit for participating in the study. The Stanford Diagnostic Reading Test, Test 1: Reading Comprehension, was administered as a screening device for the study. Students who fell in the 4th stanine were asked to participate. Thirty students were then randomly assigned to either the strategy group or the traditional group. The mean percentile ranks for each group on the Stanford Diagnostic Test were then compared to ensure equivalency for the two groups in general comprehension ability. The means for the two groups are reported in Table 1.

Table 1

Mean Percentile Ranks on the Stanford Diagnostic Test for Each Treatment Group

Strategy Group	Traditional Group
\bar{X} = 47.5	\bar{X} = 47.4
S = 2.38	S = 2.49

The stanine of 4 was selected as being representative of those college students who are considered developmental on junior and community college campuses. The present study did not include students who fell below a stanine of 4 because it was felt that decoding difficulties would interfere with the effect of the intervention strategy.

Development of the Materials

This section will describe the major procedural steps in the development of the materials used in the present study. The assessment measure was developed first and was then field tested. The process involved in this will be described as well as the resultant changes.

After the assessment passages were finalized, the instructional materials were developed for both groups.

Rationale for the Assessment Measure

In designing the present study, the experimenter attempted to eliminate some of the traditional limitations found in error detection paradigms. Winograd and Johnston (1982) have identified five major concerns. Three of the concerns directly affected the design of the present study and will be discussed briefly.

One concern is the subjects' goals for reading a passage. Since this is clearly related to comprehension monitoring, the experimenter must control for it. In the present study, subjects were given a purpose for reading: to find the main idea and details. This allowed the experimenter to assume consistent reading goals across the subjects. Another concern is the specificity of error type within the assessment passage. This was carefully controlled by embedding only internal inconsistency statements which were text-based and not "schema-driven". They were

also all inconsistent with the main idea of the passage. Another problem often found in error detection paradigms involves the accuracy of subjects' verbal reports. This is often dependent on ability to transfer information from short term to long term memory and to reconstruct a cognitive process after it has occurred. The present study required the subjects to underline inconsistencies during the reading process and also allowed them to re-read the passage if necessary when listing the main idea and details.

Initial Development of the Assessment Measure

The passages to be used for assessment in the present study were developed from a college Sociology textbook, Sociology, An Introduction, (1985). The ecological validity of the material was considered to be an important factor for measuring the effects of the present study. Consequently, actual expository passages were used, and kept as intact as possible. The field of Sociology was specifically chosen for the following reasons: it contains fairly nontechnical terminology, it provides material which is usually easy to relate to, and thus some interest is often generated for the reader.

In each of the ten passages which were initially developed, the following variables were controlled:

- (1) Each passage was approximately 170 words long. This length allowed for adequate concept development while also presenting a reasonably uncomplicated main idea.
- (2) The

readability levels of the various passages were between 11 and 7 as determined by the Fry Readability Formula. Two passages were found to be above level 9, but the experimenter felt that the results were skewed by words such as "sociologist", "generations" and "geographical" that should not be replaced, and that the concepts were not difficult. Interestingly, these two passages were not used in the final measure because the field testing indicated that they were too easy. (3) The passage content was entirely text-based. Each concept that was presented assumed no prior knowledge and provided enough information so that students needed only to access what was printed on the page. (4) The inconsistent statements which were embedded by the experimenter always followed the statement of the main idea. Winograd and Johnston (1982) note that readers may see an inconsistent statement, but assume that subsequent information will clarify it. Consequently, they read on and do not indicate that an inconsistency has occurred. The present study minimized this effect by embedding the statements after the main idea had presumably been recognized. (5) Half of the inconsistencies were contiguous to the true statement and half were non-contiguous. (6) Each inconsistency was carefully constructed so that the reader would have difficulty compensating for it. They also did not require inference making on the part of the subjects. It was the

opinion of the experimenter that each inconsistent statement was an obvious contradiction.

Ten passages were thus developed from the Sociology text. They represented a cross-section of the book to ensure content variety. They varied from the above criteria only when necessary for one of the following reasons:

(1) The average length did not represent a logical unit of thought. (2) The readability level was too high, and slight alterations were made to lower it.

Field Testing of Assessment Materials

The ten passages were given to two groups for field testing. One group was comprised of none mature readers all of whom were instructors at the college level. The second group consisted of 32 developmental college students from an urban college campus other than the one used for the experimental population. This second group was first given the Stanford Diagnostic Reading Test, Test 1: Comprehension, and was found to be equivalent to those who would participate in the actual study. These comparisons are reported in Table 2.

Table 2

Comparison of Stanford Diagnostic Test Scores
for Student Population Used for Field Testing
And Student Population Used for Study

Experimental Population Stanford Scores	Field Tested Population Stanford Scores
$\bar{X} = 47.4$ percentile rank = 26 stanine = 4th	$\bar{X} = 47.5$ percentile rank = 26 stanine = 4th

Both groups participating in the field testing were given the same set of instructions along with the passages:

1. As you read the passage, underline anything that doesn't make sense to you. This could be a group of words, an entire sentence or anything else that just doesn't fit in the passage.
2. Below each passage, in the space provided, write what you think the author's main idea is. Following the main idea, list all the details in the passage that help to explain it. You may refer back to the passage as often as you like to find this information.
3. You have as much time as you need to complete this.

The faculty group was given the entire set of ten passages with one week to complete it; however, each of the students received only five passages. The five passages were arranged in two sets of booklets with each set

containing a balance of contiguous statements and non-contiguous ones. Each passage then was read by a total of 16 students. Since the students were required to complete the passages in one classroom sitting, the experimenter felt that ten passages per student would have been an overload and the results invalid.

The faculty results were evaluated first and their ability to identify the inconsistencies is reported in Table 3.

Table 3

Percentage of Faculty Identifying Embedded
Inconsistencies for each Passage
in Field Text

<u>Passage</u>	<u>Percentage of Faculty Correctly Identifying Inconsistency</u>
1	100%
2	75%
3	100%
4	75%
5	75%
6	100%
7	100%
8	63%
9	88%
10	100%

Passage 8 was subsequently deleted due to the low percentage of faculty successfully identifying the inconsistency, and also due to comments that it was "uninspiring material". After compiling the inconsistency data, the experimenter examined the main ideas that had been listed by each faculty participant. There was a general consensus among the

written responses, and from this consensus, one main idea statement was developed for each passage.

Next, the student responses were tabulated for their success in finding the inconsistencies. These percentages are reported in Table 4. The final step was to compare each student's statement of the main idea to the consensus statement that had been developed earlier. These are reported as percentages in Table 4 also.

Table 4

Percentage of Students Identifying Embedded
Inconsistencies and Main Ideas
for Each Passage in Field Test

<u>Passage</u>	<u>Identified Inconsistency</u>	<u>Identified Main Idea</u>
1	44%	56%
2	0%	73%
3	33%	73%
4	27%	40%
5	31%	31%
6	27%	33%
7	31%	13%
8	6%	19%
9	25%	94%
10	33%	66%

To determine which passages would make up the finalized assessment instrument, the experimenter reviewed the field test data using the following criteria to determine inclusion:

1. At least 75% of the faculty must have identified the inconsistent statement.

2. No more than 33% of the students must have identified the inconsistent statement.
3. No more than 40% of the students must have identified the main idea of the passage. (A slightly higher percentage of success was sought for main idea identification to help ensure that students had comprehended the passages.)

Based on the above criteria, four passages were included in the final instrument. Only two changes were made in these passages. First, the inconsistency in passage #5 was made more syntactically correct. It was felt that the original form may have led the faculty participants to compensate for the statement when it was read. The second change was to passage #6 where the inconsistent statement was made contiguous to the main idea. This gave the instrument a balance of two contiguous and two non-contiguous statements.

Development of the Instructional Materials

Two sets of instructional materials were developed; one for each of the two treatment groups. The materials for the traditional group were determined first, and then those for the strategy group were constructed so that similar content could be used.

Walter Pauk's "Six-Way Paragraphs" (1974) was used as the instructional basis for the traditional group. Pauk's materials are often used with developmental students at the

Session 2	relationships among phrases presented in groups
Session 3	relationships among sentences presented in groups
Session 4	relationships among sentences presented in groups
Session 5	relationships among sentences presented within a paragraph
Session 6	relationships among sentences presented within a paragraph

The materials were constructed by taking clusters of information from each of the 30 passages in Pauk. From this a student worksheet was prepared for each session. Several examples from each level in the hierarchy are given below in Figure 6.

Figure 6

Examples from the Hierarchical Framework of Materials Used for the Strategy Group

<u>Title of Pauk Passage</u>	<u>Cluster for Direct Instruction</u>
"Rudolph's Rugged Relatives"	word relationships: <ul style="list-style-type: none"> Country <ul style="list-style-type: none"> Lapland <ul style="list-style-type: none"> language <ul style="list-style-type: none"> dialect Hunting <ul style="list-style-type: none"> Herd <ul style="list-style-type: none"> Reindeer

"The Ground Hog"

phrase relationships:

Farmers' natural enemies
 Woodchucks nicknamed groundhog
 Enormous appetite
 Eats one-half ton of
 alfalfa
 Lives under ground

"Carrying Oil"

phrase relationships:

Oil shipments
 Large cargo ships
 Unwilling crew volunteers
 Dangerous voyage

"Creatures of the Dry
 World"

sentence relationships in groups:

Animals must adapt to the desert.

Many animals are required to
 take long, waterless marches.

Camels store water in humps.

Water is stored as fat
 molecules.

"What About Frost?"

sentence relationships in
 paragraph:

It may seem odd but ice itself
 sometimes can protect crops from
 frost! Some growers actually
 spray their crops with water on a
 freezing night. Water freezes
 quickly on the plants--and then a
 strange thing happens. As long as
 ice stays wet, it can't get
 colder than 32 degrees, a
 temperature many plants can stand.
 If the ice ever became entirely
 frozen and dry, it might drop many
 degrees lower, ruining the plants.

(Pauk, p. 18)

When presented to the students, the clusters were not ordered from general to specific as shown above, but rather they were arranged randomly. During each session, the materials became progressively more difficult. By the end of the session, students were required to add their own units to the clusters that were presented. Their additions were then discussed in terms of logical fit rather than ability to match any pre-determined response. Two examples are given below:

word relationships:

Hunting
Herd

phrase relationships:

Woodchucks nicknamed
groundhogs
Enormous Appetite

Live Underground

Instructional Procedure

Research has shown that strategy training that is done in groups can be as effective as individualized instruction (Allen, 1973; Kendall and Zupin, 1981; Kestner and Borkowski, 1979). Treatment effects are more likely to depend on the type of instruction given rather than whether it has been administered in a group or individualized setting (Peterson and Swing, 1983). Borkowski lists the following components as those which have the greatest likelihood of producing durable effects (Peterson and Swing,

1983): (1) consistent use of strategy, (2) use of a variety of materials, and (3) detailed instructions on how the strategy should be used.

The experimenter in the present study was influenced by these findings as well as by the desire to provide instruction in a naturalistic setting which could be realistically replicated. As a result, instruction was given to groups of five students at a time, and the components listed by Borkowski were included particularly in the strategy group.

The traditional groups of students received a type of training that has historically been categorized under the label of direct instruction. The experimenter established rapport with the group, provided materials for them, and managed their completion. The students individually worked through the materials and time on task was certainly high. The experimenter was available to answer any questions and to provide assistance with unknown vocabulary items.

At the first session, the students were instructed to read the introductory material provided by Pauk. This included his system for previewing a passage, and predicting the correct answers before reading by marking them with a dot. The student was then advised to read the passage more thoroughly and to re-check the answers. The book also explained how to complete the diagnostic chart which each student was expected to fill in at the end of every session.

The chart indicated the student's progress within each subskill category. (The subskills were listed in the section describing Development of Materials.)

When each student understood the procedure he/she was expected to follow, he/she was instructed to begin reading silently. Upon completion of the response section for each passage, the student was given an answer key. The student was told to analyze any errors that were found before proceeding to the next passage. Students were allowed to progress at their own rate.

The strategy groups of students received training which followed the direct comprehension instruction model proposed by Irwin (1986). Each instructional session included the following components of her model: explication, modeling, questioning and activities (EMQA).

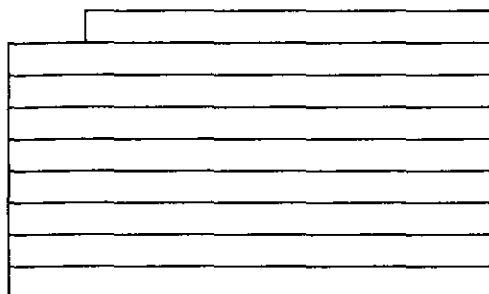
The initial session began with the experimenter directly telling the students that over a period of six meetings they would be learning a strategy designed to help them find relationships between sentences in written material. They were also told that this was an important strategy because it would not only help them to comprehend the author's main idea and supporting details, but that it was likely to help them recall information that classroom teachers often included on tests. A diagram was used to help the students visualize how finding relationships among

ideas would help them to clarify information when reading. The diagram is shown in Figure 7.

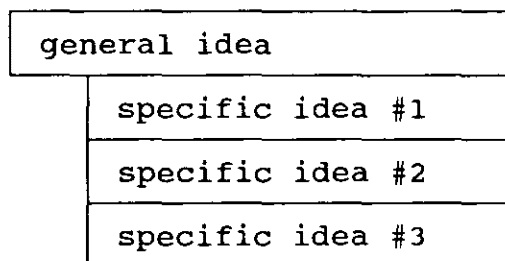
Figure 7

Diagram Used to Help Strategy Group Visualize Relationships Within a Paragraph

Traditional Paragraph Form



Relationships Within a Paragraph



When it became evident that the students understood the strategy and its purpose, and that they saw the distinction between "general" and "specific", the experimenter initiated the second component of the instruction, modeling. During this phase, the experimenter, using sets of word clusters, verbalized the mental process that she followed to organize the words according to the general to specific relationship.

For the third phase of the EMQA model, questioning, five examples of word clusters were given to the entire group. Each student was asked to choose one cluster and arrange the words in order from most general to the most specific. Once the ordering had been completed individual-

ly, the student was asked to verbalize to the group the process that he/she had used.

The last component of the model, activity, consisted of independent written practice. The students worked on an individual worksheet, but the experimenter was available for questions, and also to provide corrective feedback.

Each of the subsequent instructional sessions followed the same basic format. Time was allowed at the beginning of each session, however, for a brief review of the preceding lesson and its relevance to the coming session.

Collection of Data

Upon completion of the six instructional sessions, each student was scheduled to meet with the experimenter individually for one hour. During this assessment session, the student was required to read the four passages which have been described in the section, Development of Assessment Material, and which can be found in Appendix A. The task for each passage was completed separately and the following techniques were used with each one.

Before reading, the student was given instructions that have been detailed in the Field Testing section of this chapter. After reading, the experimenter asked the student to explain any underlining that he/she had done while reading the passage. If the embedded inconsistency had not been underlined, the experimenter would probe the student by reading two sentences from the passage, and asking the

student to explain how each one fit into the overall message. One of the two sentences would be the inconsistent one, and the other would represent a logical detail. The experimenter alternated the order in which the two probes were read. It was the opinion of the experimenter that by including a consistent detail in the probe, there would be less effect on the student's response when reading the next passage. The student was given no feedback from the experimenter, and upon completion of the fourth passage, the session was terminated.

Preparation for Analysis

The students' responses to the inconsistencies in each passage were given the following scores:

<u>Value</u>	<u>Criteria</u>
4	If the student spontaneously underlined the inconsistency and stated that it was confusing in the text.
3	If the student did not spontaneously underline the inconsistency but recognized it when probed by the experimenter.
2	If the student did not underline the inconsistency and did not recognize it when probed by the experimenter.
1	If the student included the inconsistency as either a main idea or supporting detail.

The students' listings of the main ideas and supporting details were checked against the consensus main ideas that were generated during field testing and were subsequently given the following scores.

<u>Value</u>	<u>Criteria</u>
2	Identification of the specific main idea.
1	Identification of the general topic
0	No recognition of the passage theme

A second reader was also asked to judge the students' recognition of the main idea.

Statistical Analysis

Group means were calculated and the data were analyzed with two separate one-way ANOVA procedures. Group membership was the independent variable. The dependent variable in the first ANOVA procedure was the score on the test for comprehension monitoring. The dependent variable in the second ANOVA procedure was the score for main idea identification.

CHAPTER IV

RESULTS AND DISCUSSION

This chapter will describe and discuss the results of the data analysis for the present study. The dependent variable of primary interest was the score achieved by the students on the scaled measure of comprehension monitoring. The specific monitoring standard that was measured was that of internal consistency, and therefore, students were assessed on their ability to recognize embedded statements that were inconsistent with the overall text in each of four given passages. The analysis of these scores will be presented first. Secondly, the results for identification of the main idea will be presented and discussed. These were also scored on a scaled measure which assessed the students' ability to distinguish the specific main idea from the general topic for each of the same four passages. Both sets of data will be considered in relationship to the two research hypotheses. In addition, experimenter observations and a qualitative analysis of the use of standards other than internal consistency will be reported.

Results of Monitoring Comprehension
with the Internal Consistency Standard

The primary purpose of this study was to determine if developmental college students would increase their ability to recognize inter-sentence ambiguities through the application of the internal consistency standard for comprehension monitoring following direct instruction in finding general to specific relationships between idea units (macroprocessing). Previous research indicated that poor readers at this level tend to use the lexical standard (determination of individual word meanings) to measure their comprehension almost exclusively and rarely apply the standard of internal consistency to text. In order to investigate the results of the proposed instruction, two groups were randomly formed from a given population. The control group received traditional "comprehension assessment" worksheets. For this study, comprehension assessment was defined as a method in which students continuously self-corrected their responses to comprehension questions but never received any instructional intervention. Consequently, no matter how they scored, they simply received more worksheets that continued to test their ability to answer correctly. This group also had minimal verbal exchanges with the instructor. The strategy group, on the other hand, received direct training in the technique of finding relationships between general and specific levels of importance. Following six instruc-

tional sessions, all students were assessed on their ability to find embedded inconsistencies in four separate passages.

Using the assessment measure, which has been described more thoroughly in Chapter III, student responses received a score ranging from one (1) to four (4) on each passage. The criteria for each score were as follows:

<u>Criteria</u>	<u>Score</u>
spontaneous underlining of the inconsistency and a verbal statement that it was confusing	4
no spontaneous underlining, but recognition of inconsistency when oral probe was presented	3
no recognition of inconsistency	2
inclusion of inconsistency as main idea or detail	1

Since the students each read four passages, the possible range of individual scores was sixteen (16) to four (4). The mean scores and standard deviations for both groups are reported in Table 5.

Table 5

Mean Scores and Standard Deviations
Based on Application of
Internal Consistency Standard

<u>Control Group</u>	<u>Strategy Group</u>
n = 12	n = 12
\bar{X} = 9.08	\bar{X} = 12.1
s = 1.27	s = 2.04

The following null hypothesis was tested.

Null Hypothesis: There is no difference between treatment groups in ability to recognize inconsistent details within a given passage as measured by underlining while reading followed by probed questioning.

To test the null hypothesis, a one way analysis of variance was applied to the scores of both groups. The results indicate that there was a significant effect at the .01 level, and that, therefore, the null hypothesis should be rejected. The results of the analysis are presented in Table 6.

Table 6

Analysis of Variance for Use of the
Internal Consistency Standard on
the Assessment Measure

Source of Variance	SS	df	MS	F
Between Groups	66.66	1	66.66	13.35**
Within Groups	109.84	22	4.99	

Results of Identification of the Main Idea

The present study also examined the students' ability to identify the main idea in the assessment passages. The concept of main idea had been addressed in both the control and the experimental sessions. The control group was continuously engaged in a self-assessment of its ability to

** p .01

choose a correct main idea while the strategy group's training in finding general and specific idea units was assumed to be closely related to identification of the main idea.

For the assessment task, each student was instructed to read each selection for the purpose of determining the main idea and details. Following their silent reading, they were to write down what they considered to be the main idea along with as many supporting details as possible. Their responses were scored from two (2) to zero (0) with the following criteria being applied:

<u>Criteria</u>	<u>Score</u>
identification of the specific main idea	2
identification of the general topic	1
no recognition of the passage theme	0

Since the students each read four passages, the possible range of individual scores was eight (8) to zero (0). The mean scores and standard deviations for both groups are reported in Table 7.

Table 7

Mean Scores and Standard Deviations
Based on Identification of the Main Idea

Control Group	Strategy Group
n = 12	n = 12
\bar{X} = 3.08	\bar{X} = 4.92
s = 1.19	s = 1.26

A second reader scored half the passages for all of the students and the inter judge agreement was 71%.

The following null hypothesis was tested.

Null Hypothesis: There is no difference between treatment groups in ability to identify the central idea unit in a given passage as measured by the listing of the main idea.

To test the null hypothesis, a one way analysis of variance was applied to the scores of both groups. The results indicate that there was a significant effect at the .01 level, and that therefore, the null hypothesis should be rejected. The results of the analysis are presented in Table 8.

Table 8

Analysis of Variance for the Identification
of the Main Idea on the Assessment Measure

Source of Variance	SS	df	MS	F
Between Groups	15.04	1	15.04	10.44**
Within Groups	31.59	22	1.44	

Experimenter Observations and Qualitative Analysis

As noted in an earlier section, the research shows that less proficient readers often rely on the lexical standard for checking their ability to comprehend. When applying this standard exclusively, readers fail to process the overall meaning of a selection and focus instead on words as discrete units. Although the use of this standard was not the focus of the present study, the experimenter was interested to observe the number of students who applied it when reading the assessment passages. Based on the students' spontaneous underlinings, as well as their oral responses, the experimenter attempted to analyze informally the use of the lexical standard. Table 9 shows the results.

** p .01

Table 9

Percentage of Students Applying the
Lexical Standard as Indicated by
Spontaneous Underlining and
Oral Responses

	Control Group	Strategy Group
	n = 12	n = 12
Passage One	25%	--
Passage Two	58%	25%
Passage Three	--	--
Passage Four	--	--

The percentage of students applying the lexical standard for Passages One and Two led the experimenter to look more closely at these passages. In Passage One, the following underlined words were confusing enough to interfere with individual reader comprehension:

Sentence #1: A study done during the Depression of "Middletown" found differences between the business class and the working class.

Student

Comment: "I never heard of Middletown. What is this all about?"

Sentence #2: The outward differences between classes have stayed the same over the years.

Student

Comment: "What does this mean? The way they looked? It doesn't make sense."

In both cases, the students were so distracted by the individual word meaning, that the overall meaning of the passage became secondary.

Passage Two contains a greater number of words that could be unfamiliar to the population in the study. Even though the words in question are followed directly by a definition, the control group seemed to apply the lexical standard exclusively in this passage. The following sentences contain the words that were the most disruptive.

Sentence #1: They often joined guilds which were a type of medieval trade union.

Sentence #2: Those who didn't wish to marry could join Beguines, urban communes of seven or eight women who pursued such occupations as sewing, baking, spinning and weaving.

Students consistently underlined the indicated words and referred to them as "not making sense". The strategy group, for the most part, did not appear to be as affected by the unfamiliar terms. They seemed to be reading for more meaningful units.

Another strategy that was interesting to note in regard to previous findings, was the students' attempt to apply the monitoring standard of external consistency. The application of this strategy means that a student is comparing the information in the text to that which he/she has acquired elsewhere. Baker (1985) has reported that this is a standard rarely used by students even when they are directed to do so. The assessment passages for the present study were chosen in part because the content for each was entirely text-based. In other words, comprehending each

passage did not seem to require any prior knowledge of the topic. Thus, even though the use of prior knowledge is always a desirable strategy, students could have comprehended, in these instances, without activating their prior knowledge in the area. In fact, it was assumed by the experimenter that these students would have little schema to activate for the particular topics that were presented. Since this is a strategy that is rarely applied by less proficient readers, it was of interest to note how the students used it. For many of those who did compare the passage content to their prior knowledge, the schema that was activated was so inappropriate that it had a negative impact on their comprehension. It led them to report unfounded inconsistencies. Table 10 shows the results of both groups on this observation.

Table 10

Percentage of Students Applying the
External Consistency Standard Inappropriately

	Control Group	Strategy Group
	n = 12	n = 12
Passage One	25%	8%
Passage Two	33%	17%
Passage Three	--	8%
Passage Four	--	8%

It is evident that some members of both groups of readers applied the standard inappropriately at times. The control group showed more instances of it in general, but

Passage Two seemed to present difficulties to both groups. This could be related to the fact that most of the subjects were female, and the topic in Passage Two dealt with women's economic role in society. Consequently, it may have been a theme for which they had very definite schema, and the information in the text contradicted their own personal experiences.

A sampling of examples of how the subjects applied the external consistency standard inappropriately in all four passages appears in Table 11.

Table 11

Examples of Inappropriate Application of
the External Consistency Standard

Passage One

Statement from Text: When the study was originally done the business class lived in larger and better quality housing than did the working class.

Student Comment: "The business class doesn't live like that."

Statement from Text: The outward differences between classes have stayed the same over the years. (embedded inconsistency)

Student Comment: "There will always be differences. They will never be equated. The wealthy would stay the same but the poor wouldn't."

Passage Two

Statement from Text: It is only recently that women have influenced the economy. (embedded inconsistency)

- Student #1 Comment: "It is only now that they have really influenced the economy."
(underlining reflects student emphasis)
- Student #2 Comment: "It's only recently that they have been considered worthwhile contributors."
- Student #3 Comment: "Now they take on bigger roles; jobs that went to men earlier."

(These student comments all represent attempts to explain how the embedded inconsistency fits into the passage where in actuality it directly conflicts with the information given.)

The comment from student #3 is particularly indicative of the possibility of an "emotional schema" since the passage specifically detailed how women in the Middle Ages "became traders and innkeepers and occasionally ran breweries and blacksmith shops".

Passage Three

Statement from Text: Doctors were often poor and had little work to do. They sometimes had to beg in the streets to survive.

Student Comment: "That doesn't make sense. That would never happen to doctors."

Passage Four

Statement from Text: If you had been born when it (the baby boom) began, you might not have gone to nursery schools because they were full.

Student Comment: "There weren't any nursery schools back then."

The students who made the comments reported in Table 11 became so involved in defending their position of "it just couldn't be" that their processing of the overall message and comprehension came to a halt.

The third, and last issue, that will be discussed relates to the observation of the Grice Principle (1975) within the present study. This concept has been reported in the research and refers to the tendency in less proficient readers to accept uncritically any material that is in print. The readers are reticent to take issue with an author's message, and will go to extremes in order to make the information "fit". The experimenter found this to be a significant phenomenon, particularly in the responses of the control group. The percentages for both groups are reported in Table 12.

Table 12

Percentage of Students Applying the
Grice Principle to the Text

	<u>Control Group</u>	<u>Strategy Group</u>
	n = 12	n = 12
Passage One	8%	--
Passage Two	8%	--
Passage Three	67%	--
Passage Four	58%	--

Table 13 reports the student responses that were recorded when the experimenter read the following embedded

inconsistent statement from Passage Four: The baby boom had very little effect on our education.

The student comments reflect their explanation of how the statement "fits" into the entire passage when, in fact, the purpose of the passage was to describe the many negative effects that the baby boom did have on our education.

Table 13

Control Group Responses to
Passage Four Inconsistency

- Student #1 Comment: "I disagree, but the facts say it."
- Student #2 Comment: "It didn't affect children's ability to learn."
- Student #3 Comment: (After much hesitation, apparent confusion and reading aloud of the details, this student made it fit with the following conclusion.) "I guess the educational system still worked."
- Student #4 Comment: "Oh yeah, it was confusing, but I did fit it in. Even though elementary school was crowded, the children still completed college and competed for jobs."
- Student #5 Comment: "Our educational system is so strong that overcrowded conditions couldn't affect it."
- Student #6 Comment: "The children were still able to get a good education."

Similar attempts were recorded for Passage Three indicating that, again, the students wanted the statement to "fit". The embedded inconsistency which was read for Passage Three was: The scientific training that doctors

received in American medical schools at the time helped them a great deal.

The passage content described how, during the American Revolution, doctors received their only formal training in Europe, that this included no science, and that in America an informal apprenticeship program was the only training available. Table 14 reports some of the comments that were made in response to the statement.

Table 14

Control Group Responses
to Passage Three Inconsistency

- Student #1 Comment: "They probably got lessons that they didn't get from those other schools."
- Student #2 Comment: "They weren't getting it in Europe, so they waited until they could have it here."
- Student #3 Comment: "The training that they received really helped them to treat patients."
- Student #4 Comment: "They didn't get good training in Europe. The American schools had to give them extra help."
- Student #5 Comment: "American schools gave the scientific training that the European schools didn't provide."
- Student #6 Comment: "Since they had no schooling, only apprenticeships, American schools helped a lot."

Similar responses were not recorded for the strategy group.

This appears to offer some support for the idea that instruction in finding general and specific relationships

leads students to construct hierarchical relationships between sentences as they read and to eliminate those concepts that don't fit. In other words, these students may have a greater expectation that the material should make sense across passages and they are more actively involved in selecting the meaningful content. The strategy group, as a result of direct instruction, may feel more in control of the process and less willing to accept contradictory text.

It appears that for this study, developmental college students given direct instruction in general to specific relationships did increase their use of the internal consistency standard for monitoring their comprehension more than did students who received a traditional comprehension assessment model of instruction. In addition, there is evidence that these students were also able to identify the main idea of an expository passage more accurately than those who received the traditional treatment.

There is also some observational evidence that lends support to the idea that less proficient students may rely on the lexical standard in some instances, apply the external consistency standard inappropriately and be reticent to critically appraise a written text.

The implications of these results will be discussed in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS, LIMITATIONS AND IMPLICATIONS

This chapter will provide a summary of the present study and will also discuss conclusions which can be drawn from the findings. In addition, the limitations of the research will be examined, and finally, the implications for instruction and further research will be presented.

Summary

This section will summarize separately the following elements of the study: (1) the purpose, (2) the sample, (3) the design, (4) the materials, (5) the instructional procedure, (6) the data collection procedures, (7) the data analysis procedures, and (8) the results.

Purpose

The purpose of the present study was to examine the effects of direct instruction in macroprocessing on students' ability to recognize inconsistent statements within expository passages. Specifically, students were taught to organize units of written text according to a relationship of general to specific information. As they proceeded through the instructional units, it was continuously emphasized to them that being logical was more

important than any pre-determined order. Students were also urged to focus on overall relationships rather than on unfamiliar vocabulary that might occur within the units.

It was felt that this type of comprehension instruction would increase the students' tendency to spontaneously check the relationships among sentences in a given expository passage. Thus, those students receiving direct instruction in macroprocessing would be more likely to detect across-sentence inconsistencies. It was also felt that they would recognize the main idea of a selection more readily than others.

Sample

The sample for this study consisted of college students at an urban campus in Chicago. These students were selected on the basis of their comprehension scores on the Stanford Diagnostic Reading Test which is administered to all incoming students at the institution. All students who received a stanine score of four, and who as a consequence were registered for the Reading Lab course during the winter quarter, were identified by the experimenter. From this population, 30 students were randomly selected to participate in the study. These 30 students were then assigned to small groups of five which were randomly divided into two treatment groups of equal size ($n = 15$). During the instructional period of the experiment, six students were eliminated from the study due to the following reasons:

hospitalization, poor attendance (two absences), native language interference, and dropping out of school.

Design

A simple two-treatment randomized design was used. The independent variable was treatment, and the dependent variable of primary interest was the students' score on the measure of their use of the internal consistency standard. A second dependent variable was the students' score on the measure of their ability to identify the main idea.

Materials

The instructional materials that were used for the control group were 15 passages reproduced directly from Walter Pauk's Six Way Paragraphs (1974). They were used as prescribed in the book with the comprehension questions, self scoring answer key, and self assessment charts. The questions for each passage fell into the following ordered categories: subject matter, main idea, supporting details, conclusion, clarifying devices, and vocabulary in context. The students then were repeatedly exposed to the same types of questions which addressed the same set of skills throughout the instructional period.

The strategy group instructional materials were developed by the experimenter and were based on the content covered in Pauk's paragraphs. Six sets of exercises were developed and presented in the following sequence: one set

of word units, one set of phrase units, two sets of sentence units, and two sets of intact passages taken directly from Pauk's book. Within each unit that was constructed, other than the intact passages, the information was randomly ordered. The students' task was to re-order the material from most general to most specific.

Four assessment passages ranging from 9th grade to 11th grade readability on the Fry scale were adapted from a freshman level Sociology textbook. The passages averaged 181 words in length. For each passage, a statement that was inconsistent with the main idea was embedded by the experimenter. The statement appeared in various locations for each passage, but it always came after the main idea had been expressed. In two passages, the inconsistent statement was contiguous to the main idea concept and in the other two, it was non-contiguous.

For each passage, the student was directed to underline anything that "didn't make sense" and also to record the main idea and details. Upon completion of this task, the student was asked to explain all underlinings that had been made. If the inconsistent statement was not included, the experimenter read two statements from the passage to the student and asked him/her to explain how each one "fit" into the whole message of the passage. One statement that was read was the inconsistency, and the other

was one that had a logical fit. The inconsistent statement was read first fifty percent of the time.

Instructional Procedure

At the first instructional session, the students in the control group were given a booklet which contained the directions for completing the passages. After reading the booklets, they were given an opportunity to ask questions, and then the experimenter demonstrated how the self-diagnostic charts would be completed. Following this, each student was given a set of passages and directed to proceed at his/her own pace. This self-paced repeated exposure model continued for the remaining five sessions with only occasional questions being directed to the experimenter.

The strategy group received direct instruction based on the EMQA model starting with the first session. Each session was structured around the components of explication, modeling, questioning and activity. During the first session, the explication segment consisted of an overview of the method that would be taught and how it related to the reading process in general. For each successive session, this component began with a review of any difficulties from the preceding session and was followed by a direct explanation of the next unit to be taught. The modeling component then allowed the students to listen to the experimenter's cognitive strategy for finding the general to specific relationships. During the questioning segment of

the session, students provided the modeling as they verbally worked through the relationships. The activity step allowed time for worksheets to be completed individually before the session concluded.

Data Collection Procedures

Following three weeks of small group instruction, the subjects were tested individually in a quiet room. All testing was conducted within one week of the final instructional session. Subjects were given a booklet and asked to read the written set of directions that appeared on the cover before turning the page. After they read the directions, the experimenter re-stated them to ensure comprehension. The subjects then completed the assigned task and orally responded to the experimenter for each passage before moving on to the next one.

The subjects were asked to write down the main idea and details following the reading of each passage. This was done to ensure a similarity in purpose for reading. The responses were not discussed but were subsequently scored by the experimenter according to a three point scale indicating whether the student had identified the specific main idea (score of 3 given), the general topic (score of 2 given), or had not identified either one (score of 0 given).

The oral response that was required of each student was for them to read anything that they had underlined and to explain why. The experimenter wrote down the student

responses. If the embedded inconsistency had been underlined by the student during his/her reading, it was scored as a "spontaneous recognition" and given a score of 4. If it was not underlined, then the experimenter read the two statements described earlier. The student responses were then scored according to whether or not they recognized it orally. A score of 3 indicated that there had not been a "spontaneous recognition" but that the student had recognized it when probed. A score of 2 meant that the student did not recognize the inconsistency in either instance. Later, the experimenter checked the written responses to determine whether the inconsistency had been included as a main idea or detail in which case a score of 1 was given.

Data Analysis Procedure

Each subject received two total scores. One score reflected his/her identification of the main idea on the three point scale which is described above. The second score reflected the student's recognition of the embedded internal inconsistency on the four point scale which is also described above. Once these scores were computed by the experimenter, two separate one-way analyses of variance were applied to them.

Results

Null Hypothesis One: There is no difference between treatment groups in ability to recognize inconsistent details within a given passage as measured by underlining while reading followed by probed questioning.

Hypothesis One was rejected. There was a statistically significant difference between the strategy group and the control group at the .01 level as determined by a one-way ANOVA in terms of the dependent measure of internal inconsistency.

Null Hypothesis Two: There is no difference between treatment groups in ability to identify the central idea unit in a given passage as measured by the listing of the main idea.

Null Hypothesis Two was rejected also. There was a statistically significant difference between the strategy group and the control group at the .01 level as determined by a one-way ANOVA in terms of the dependent measure of identification of the main idea.

There was also some observational evidence, reported informally by percentages of students in both treatment groups, that students in the control group were more likely to rely on the lexical standard, to apply the external consistency standard inappropriately and to be reticent to critically appraise written text.

Conclusion and Discussion

Related to Hypothesis One

The results related to the first hypothesis indicate that teaching students through a direct instructional method to look for relationships between sentences does seem to increase their use of the internal consistency standard for monitoring comprehension. Those who received the strategy training spontaneously recognized statements that were inconsistent with the main idea more often than those students who received the traditional repeated exposure instruction.

The results for the students in the strategy group may reflect their increased awareness of the hierarchical nature of text. Since the students had been taught, through direct instruction, not only to actively process units in terms of general to specific relationships, but also why this processing was important for comprehension, it is logical to assume that they applied this strategy on the assessment measure. As a result of their active search for relationships, they were probably more sensitive to units, in this case sentences, which did not fit easily into the hierarchical framework that they may have been attempting to construct.

Another emphasis made in the direct instruction sessions was that ability to logically explain a relationship was more important than ability to come to the same

conclusion as the instructor. As a result, perhaps the students had internalized the need for "self" regulation and were less reliant on "other" regulation. This could also have led them to feel more control over the comprehension process and, consequently, more confident to critically read written text. The traditional group, on the other hand, had simply been taught to choose responses from a multiple choice format and was taught to rely on an answer key ("other" regulation) rather than on themselves to assess their comprehension. This promotes more passive behavior and may reinforce a tendency to rely uncritically on written material. This could explain why these students did not notice inconsistencies; they were not used to actively processing text and they were completely dependent on written material providing only accurate information.

Related to Hypothesis Two

The results related to the second hypothesis indicate that the students who received direct instruction in finding general to specific relationships between units in text were able to more accurately identify the main idea of a given passage.

It seems evident that instruction in finding the relationship of general to specific between various units in text can increase a student's ability to identify the main idea. Since the main idea and the supporting details in a

passage reflect this general to specific relationship, this finding is a logical one.

This finding also offers support for the use of direct instruction over the instructional method of repeated exposure. The students in the direct instruction (strategy) group had been given a very explicit strategy to use to enhance comprehension. They had also been taught why it was important and how it made sense given the nature of most text. As a result, when they were given the assessment measure and told to read to find the main idea and details, they had a strategy of looking for general to specific relationships in their repertoire and were able to use it to find the main idea.

Having a well-defined strategy to use and knowing how it related to one of the goals of reading, may have been what differentiated the results of the strategy group from the traditional group. The traditional group, through repeated exposure, had never been taught how to find the main idea. Rather they had simply been continuously assessed on their ability to recognize it among three other multiple choice selections. Consequently, these students did not seem to have an appropriate strategy in their repertoire for finding the main idea.

The traditional group may also have been at a disadvantage in ability to generate a main idea which was required by the assessment measure. During their instruc-

tional sessions, their task was to choose a correct answer rather than to actively generate one on their own. The direct instruction group constantly generated relationships which may have increased their ability to generate a response on the assessment measure. This is another strength of the direct instruction method since ability to generate an answer seems to require more active processing than does a multiple choice format where the student may focus more on how to choose the best alternative than on actually comprehending the material.

Related to Experimenter Observations

During the assessment sessions, the direct instruction group seemed to have a more meaning orientation to print than the traditional group. They relied less on the lexical standard and processed information across the text. Their overall comprehension did not seem to be interrupted by unfamiliar vocabulary as it often was for the control group, but it was interrupted by statements that contradicted earlier messages. The control group seemed to depend more on the lexical standard. When an unfamiliar word was encountered, even though it was defined in the immediate context, comprehension tended to break down for this group.

The students in the control group also seemed more reticent to apply critical analyses to the written text. They assumed that the message must be logical even if they could not comprehend it. They tried more than the direct

instruction group to "fit" the inconsistency into the passage. This could be related to the instructional method which continuously reinforced the idea that the text (through an answer key) had all the answers and that the only task for the student was to choose one.

Limitations

All of the conclusions drawn from the results of the present study must be considered within its limitations. First, although the instructional groups were randomly divided into strategy and control, the students could not be randomly assigned to the small groups. This was due to scheduling problems presented by the students. They were only willing to meet within the time frame of their scheduled reading classes. This could possibly lead to another limitation related to the instruction that was being given in the various classes. Although unknown to the experimenter, perhaps there were instructors teaching reading comprehension in a similar manner.

Another limitation is that all instruction as well as assessment was conducted by the experimenter. The experimenter did follow a prescribed script when administering the assessment measure, but most scoring and all notes that were taken were evaluated solely by the experimenter.

Generalizations from the present study must be limited to the population studied, i.e., college students on an

urban commuter campus whose reading scores fall at the 4th stanine on the Stanford Reading Test.

Finally, no conclusions about long term gains can be drawn since all assessment was conducted within one week of the final instructional session.

Implications for Teaching

There are several implications for the teaching of reading comprehension to post-secondary developmental students that seem evident from the present study.

Teaching of macroprocessing should probably follow a model of direct instruction. Irwin's model of EMQA seems appropriate for the following reasons. First, it incorporates a direct explanation of the skill being taught. This gives students a framework within which new information can be stored. It also ensures that the students have a focus during instruction. Adult learners in particular want to know the relevance of a skill and how to apply it appropriately. Secondly, the modeling component is probably very important in the area of cognitive strategies. It cannot be assumed that repeated exposure to a skill leads to an internalization of how to apply it. By verbalizing his/her own cognitive process for a task, the instructor is delineating concrete steps for an abstract process. The questioning portion of the model forces a traditionally passive student to become more active. It also ensures immediate feedback and reinforcement, two important elements

of learning. Finally, the activity step begins the process of a dependent student becoming more independent. This is a necessary continuum for the developmental student who has never learned how to take charge of his/her learning.

Related to the incorporation of a direct instruction model is a recommended shift in instructional emphasis in reading. Perhaps comprehension monitoring would be a more direct result if reading were taught as an active, meaning-oriented process in which ideas across the passage can be related in a general to specific way. If students were directly instructed in the overall cognitive activities involved in reading comprehension, perhaps effective monitoring standards would evolve. This could be emphasized particularly in the modeling stage of direct instruction. Instruction often focuses on fix-up strategies to apply after comprehension has already broken down, but an emphasis on the comprehension process itself would enable students to assess earlier and more independently if their own cognitive process was succeeding. As a result, it would also make the student more aware of the processes that he/she is using as reading takes place. In order to encourage students to consciously apply a meaning orientation to print, reading instruction must not focus on the discrete nature of a skill, but rather on how a particular skill fits into the overall process. An example of this is with vocabulary instruction. If it is taught separately, it must be

continuously related to the overall comprehension process and not seen as an end in itself. The role of vocabulary should be stressed. In other words, the reader needs to view vocabulary as a cue to the comprehension process rather than as a discrete unit within it. By teaching vocabulary in units such as signal words and connectives, its role in comprehension is emphasized. Instruction in using context clues rather than in memorizing definitions seems relevant here also. These techniques may increase the students' awareness of the interactive nature of reading skills and in this particular example, may also decrease the students' over-reliance on the lexical standard of evaluation.

In addition, specifically instructing students to find relationships between idea units may have several effects. First, it probably forces students to comprehend beyond the literal level. In order to see relationships across sentences, inferences must be made by the reader. Secondly, it may lead students into becoming more active readers. In seeking relationships, they must interact with the material. They also must process information in more meaningful chunks because focusing on individual words alone will not bring success. Another effect of the instruction is that students begin to look for meaning across a passage. Their ability to process the material on a macro level may be increased and, consequently, their proficiency at conceptualizing the author's main idea may also be increased.

In the direct instruction group, logical thinking was reinforced continuously. It was emphasized that if a student could logically explain the relationship as he/she had organized it, it would be accepted. This may lead the students to see reading more as a problem solving activity than as a passive exercise with a pre-determined structure. It may also encourage them to have confidence in their own abilities and to accept more responsibility for the comprehension task.

Since teaching students to see relationships appears to be an effective strategy for finding the main idea, further instruction could build on this premise. For instance, comprehension instruction should probably include an emphasis on a variety of organizational patterns, i.e., chronological order, cause and effect, exemplification, and comparison and contrast. Strategies such as cognitive mapping, outlining and summarizing, which ensure an active manipulation of text into relationships, could be used to reinforce this type of instruction and should result in improved comprehension monitoring strategies.

Implications for Research

The present study raises several issues that have implications for further research. The issues presented here are not all inclusive, but rather are intended to suggest some of the major concerns.

The first concern relates to long term gains. Would a follow-up study with the same students produce the same results? Would the strategy group apply the internal consistency standard as effectively after several months with no direct instruction?

Also of interest is further research which would isolate the various components of the direct instruction model which was used in the present study. Is one component more effective than the others? Is there a particular combination of components that seems to be most effective? Does one teacher's application seem to be more effective than another's?

Another interesting issue is whether or not increased use of the internal consistency standard affects the students' usage of other monitoring standards. Perhaps a correlational study could be conducted to examine any possible effects. For instance, does it systematically decrease one's reliance on the lexical standard? Is there a corresponding increase in the use of the external consistency standard?

A fourth concern relates to the conducting of similar research with other populations. Is it possible to instruct elementary school children with similar materials and methodology and to increase their use of an internal consistency standard? Would similar results be found with

high school students or with a more diversified college population?

A fifth area to investigate is the transfer effect of such instruction. Would the students who have participated in the study apply the standard of consistency spontaneously to their content area textbooks? Likewise, would they use their knowledge of general to specific relationships in the application of study skills to their content reading? For example, would these students underline more relevant information in their textbooks? Would they be able to outline or summarize a section of text more effectively than their classmates who did not receive such instruction?

The present study has found significant effects both in usage of the internal consistency standard and the identification of the main idea following direct instruction in the organizational pattern of general to specific. How would direct instruction in other active, meaning-oriented strategies affect the use of the internal consistency standard?

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APPENDIX A

FINAL ASSESSMENT BY STUDENTS

DIRECTIONS FOR READING THE PASSAGES:

1. As you read the passage, underline anything that doesn't make sense to you. This could be a group of words, an entire sentence or anything else that just doesn't fit in the passage.
2. Below the passage, in the space provided, write what you think the author's main idea is. Following the main idea list all the details in the passage that help to explain it. You may refer back to the passage as often as you like to find this information.
3. You have as much time as you need to complete this. When you are finished, please turn in your completed sheets.

PASSAGE #1

A study done during the Depression of "Middletown" found differences between the business class and the working class. When the study was originally done the business class lived in larger and better quality housing than did the working class. The very wealthy had elaborate mansions with indoor plumbing and central heating. The working class homes were much smaller and often lacked indoor plumbing; water had to be carried in from an outdoor well. Heating was by a wood or coal stove.

A more recent study of "Middletown" found that it had become more difficult to identify classes among the population. The outward differences between classes have stayed the same over the years. Now the working class lives in houses that are only slightly smaller than those of the business class, and they contain all of the extras that modern society provides--not only indoor plumbing and central heating, but also self-cleaning ovens, trash compactors, and other labor-saving devices. The wealthy, while living modestly in town, spend more of their money less conspicuously out of town. For example, they buy condominiums and boats in Florida. Today, then, it may be more difficult to tell who belongs to what class.

MAIN IDEA:

DETAILS:

PASSAGE #2

The status of women in the workplace is often treated as if it were a new issue, but women have always played an important economic role in society. During the Middle Ages, they produced much of what was needed in the home and also made items for sale in the marketplace. With the growth of large cities at the end of this period, new options became available to them. They became traders and innkeepers and occasionally ran breweries and blacksmith shops. They often joined guilds which were a type of medieval trade union. It is only recently that women have influenced the economy. Those who didn't wish to marry could join Beguines, urban communes of seven or eight women who pursued such occupations as sewing, baking, spinning and weaving. Women from the upper class could join convents and become nuns. At that time, some convents had great scholarly reputations and were political forces to be reckoned with. Other women worked as maids or servants for very low wages. For most women, however, family life was the most secure option.

MAIN IDEA: _____
_____DETAILS: _____

PASSAGE #3

There were only a few physicians in this country at the time of the American Revolution and they were trained in Europe, where they studied Latin or Greek. There was little science taught in universities in those days, and no medical science. Most physicians learned to practice medicine by being an apprentice to a physician, taking on more and more responsibility until they were able to venture out on their own, often to the frontier to seek patients who needed their services. The scientific training that doctors received in American medical schools at the time helped them a great deal. The medicine practiced was often "heroic medicine", a dramatic intervention by the physician. Patients were bled, blistered, and given poisonous laxatives in an attempt to kill the disease. Often the treatment killed the patient. Most people went to doctors only when they were desperate. Doctors were often poor and had little work to do. They sometimes had to beg in the streets to survive.

MAIN IDEA: _____
_____DETAILS: _____

PASSAGE #4

Why were so many people born in the middle of this century? During the depression of the 1930's and World War II in the 1940's, many people postponed having children. After the war, the country was both peaceful and prosperous. Those who had postponed having families, and those who were just entering their twenties began having children. Because the times were so good, some people decided to have three or four children instead of just two. This period is called the "baby boom".

How has the baby boom affected your life? If you had been born when it began, you might not have gone to nursery school because they were full. Schools were crowded, and you might have gone to elementary school in a temporary classroom building. The baby boom had very little effect on our education. Baby boom children had to compete for space in college. When they completed their education, unemployment rates were high because so many people were competing for jobs and because only a small part of the work force was retiring to create more job openings.

MAIN IDEA:

DETAILS:

STUDENT ASSESSMENT

Student Name: _____

Date: _____ Group: _____

PASSAGE 1Scores

main idea/details: _____

inconsistency: spontaneous _____

oral recognition _____

no recognition _____

inclusion _____

- probes: 1. The outward differences between classes have stayed the same over the years.
2. The very wealthy had elaborate mansions with indoor plumbing and central heating.

PASSAGE 2

main idea/details: _____

inconsistency: spontaneous _____

oral recognition _____

no recognition _____

inclusion _____

- probes: 1. During the Middle Ages, they produced much of what was needed in the home and also made items for sale in the marketplace.
2. It is only recently that women have influenced the economy.

STUDENT ASSESSMENT (part 2)PASSAGE 3Scores

main idea/details: _____

inconsistency:

spontaneous _____

oral recognition _____

no recognition _____

inclusion _____

probes:

1. The scientific training that doctors received in American Medical schools at the time helped them a great deal.
2. Most people went to doctors only when they were desperate.

PASSAGE 4

main idea/details: _____

inconsistency:

spontaneous _____

oral recognition _____

no recognition _____

inclusion _____

PROBES:

1. Because the times were so good, some people decided to have three or four children instead of just two.
2. The baby boom had very little effect on our education.

APPENDIX B

MATERIALS USED BY TRADITIONAL GROUP
(from Walter Pauk, Six-Way Paragraphs, 1974)

INTRODUCTION

The paragraph! That's the working-unit of both writer and reader. The writer works hard to put meaning into the paragraph; the reader works hard to take meaning out of it. Though they work at opposite tasks, the work of each is closely related. Actually, to understand better the job of the reader, one must first understand better the job of the writer. So, let us look briefly at the writer's job.

To make his meaning clear, a writer knows that he must follow certain basic principles. First, he knows that he must develop only one main idea per paragraph. This principle is so important that he knows it backwards, too. He knows that he must not try to develop two main ideas in the same, single paragraph.

The next important principle he knows is that the topic of each main idea must be stated in a topic sentence and that such a sentence best serves its function by coming at or near the beginning of its paragraph. He knows, too, that the more clearly he can state the topic of his paragraph in an opening sentence, the more effective he will be in developing a meaningful, well-organized paragraph.

One word of warning to the reader: there is no guarantee that the topic sentence will always be the first sentence of a paragraph. Occasionally, a writer will start off with an introductory or a transitional sentence. Then, it is up to the reader to spot such a sentence, and recognize it for what it is.

The topic sentence may be placed in several other positions in a paragraph. It may be placed in the middle, or even at the very end. If it appears at the end, though it may still be a topic sentence in form, in terms of function, it is more rightfully a restatement. Whenever the end position is chosen, it is chosen to give the restatement especial emphasis.

Finally, a paragraph may not have a topic sentence in it at all. Some writers purposely leave out such sentences, presumably, to lend an air of sophistication to their writing. But, in such cases, inferring a topic sentence may not be so difficult as it may at first appear. Here's why. Inside information has it that many such professional writers actually do write topic sentences, but on separate scraps of paper. They then place one of the scraps at the

head of a sheet and use the topic sentence to guide their thoughts in the construction of the paragraph. With the paragraph written and the topic sentence having served its purpose, the scrap is discarded. The end result is a paragraph without a visible topic sentence, but the paragraph, nonetheless, has embedded in it all the clues that an alert reader needs for making an accurate inference.

Actually, there is nothing especially important in recognizing or inferring a topic sentence for its own sake. The important thing for the reader is in his using the topic sentence as a quick means for establishing a focal point around which to cluster the meaning of the subsequent words and sentences that he reads. Here's the double-edged sword again: just as the writer used the topic sentence to provide focus and structure for presenting his meaning, so the perceptive reader can use the topic sentence for focus and structure to gain meaning.

Up to this point, the reader, having looked secretly over the writer's shoulder, should have learned two exceedingly valuable secrets: first, that he should always look for only one main idea in each paragraph; and secondly, that he should use the topic sentence to lead him to the topic of each paragraph.

Now, there is more to a writer's job than just writing paragraphs consisting of only bare topic sentences and main ideas. The balance of his job deals with developing each main idea through the use of supporting material which amplifies and clarifies the main idea and many times makes it more vivid and memorable.

To support his main ideas, a writer may use a variety of forms. One of the most common forms to support a main idea is the example. Examples help to illustrate the main idea more vividly. Other supporting materials are anecdotes, incidents, jokes, allusions, comparisons, contracts, analogies, definitions, exceptions, logic, and so forth.

To summarize, the reader should have learned from the writer that a textbook-type paragraph usually contains these three elements: a topic sentence, a main idea, and supporting material. Knowing this, the reader should use the topic sentence to lead him to the main idea. Once he grasps the main idea, then everything else is supporting material used to illustrate, amplify, and qualify the main idea. So, in the final analysis, the reader must be able to separate the main idea from the supporting material, yet see the relationship between them.

ORGANIZATION OF THE TEXT

The Questions

At the end of each passage, there are six questions to answer. The six questions will always be within the framework of the following six categories: subject matter; main ideas; supporting details; conclusions; clarifying devices; and vocabulary in context. By repeated practice with questions within these six essential categories, students will develop an active, searching attitude when reading other expository prose. These questions will help them become aware of what they are reading at the time of the actual perception of the words and phrases, thus setting the stage for high comprehension.

The Diagnostic Chart

Fast and sure improvement in reading comprehension can be made by using the Diagnostic Chart to identify relative strengths and weaknesses. The Diagnostic Chart is a very efficient instrument. Here is why and how it works.

The questions for every passage are always in the same order. For example, the question designed to teach the skill of recognizing the main idea is always in the number two position, and the skill of drawing conclusions is always in the number four position, and so on. This innovation of ordering the questions sets the stage for the functioning of the Diagnostic Chart.

The Diagnostic Chart functions automatically when the letters of answers are placed in the proper spaces. Even after completing one passage, the chart will reveal the types of questions answered correctly, as well as the types answered incorrectly. But more important for the long run, is that the chart will identify the types of questions that are missed consistently. Such identification is possible after three or more passages have been completed. By then, a pattern should be observable. For example, if a student's answers to question number four (drawing conclusions) were incorrect for all three passages, the weakness would be obvious immediately. Once a weakness in drawing conclusions, for example, is ascertained, the following procedure is recommended: First, he should reread the question; then, with the correct answer in mind, he should reread the entire passage trying to perceive how the author actually did lead to or imply the correct conclusion. Second, on succeeding passages, he should put forth extra effort to answer correctly the questions pertaining to

drawing conclusions. Third, if the difficulty continues, he should arrange a conference with his instructor.

TO THE STUDENT

How to Get the Most For Your Time and Effort

Some people call these techniques "tricks of the trade." In academic circles, however, they are called "scholarly principles." It doesn't matter what they are called. What really matters is that they work.

Title Scrutiny

Just the other day at lunch, one old-timer, an English professor already retired some fifteen years, did use the work "trick." He said, "I didn't discover the trick until I was an assistant professor. Wished I had known about it as a freshman." He explained the trick by saying, "The first thing I do is to read the title of everything. Then, I spend a few seconds thinking about it." He continued, "Remember! An author spends more time thinking up a just-right title than he does thinking about any other single portion of the paper. He tries to pack into the title as much meaning as he can. So, I take advantage of it, by thinking about the title, even for a few seconds. I try to take out of it as much meaning as I can, thus getting a head-start on the whole process of reading."

"Title scrutiny does one more thing for you that most people don't know about. It starts you off concentrating on the story or article before you actually begin reading it. Why? A few moments thinking about the title fills your head so full of thoughts about the story that there's no room for anything else to get in to break concentration. That's a trick, too," he chuckled. "People talk about having trouble concentrating when reading. That's one trouble I never had," he said.

The Dot System

Here is a system that will speed up your reading and sharpen your comprehension skills. After spending a few seconds with the title, move rapidly through the passage. Then, without looking back over the passage, answer all of the questions by placing a dot in the square beside the option that you think is correct. The dot will indicate your unofficial answer.

This system is a game you play. You will find that you will try extra hard to grasp and retain more and more as

you progress through the book. This extra effort will, in fact, make you a better reader permanently.

The Check-Mark System

Having answered all of the questions tentatively with a dot, now reread the passage and, this time, indicate your official answer by placing a check mark (✓) in the square next to the option that you think is correct. This check-marked answer will count toward your final score.

The Diagnostic Chart

Transfer your official answers to the Diagnostic Chart. Do this by writing your official answer in the upper portion of each block. When scoring your answers, do NOT use an X-mark for incorrect, nor a C-mark for correct. Instead, use the following method. If the answer is correct, make no additional mark within the answer block. So, if correct, the bottom portion will be unmarked. But, if your official answer is incorrect, then write the correct answer-letter in the bottom portion of the specific block. Your incorrect answers are the ones to worry about. So, your incorrect answers will have in the one block, your own answer and the answer gotten from the answer key. This sets the stage for the next step: "Taking Corrective Action."

Taking Corrective Action

Your incorrect answers can provide you with a rich opportunity for self-learning. To take this opportunity, then, investigate all incorrect answers by going back to the original question to read the correct option several times. With the correct option well in mind, turn back to the passage itself to see why the approved answer is correct and analyze why you chose the incorrect option.

Graphing and Recording Your Progress

It would be good to have both the Diagnostic Chart and Comprehension Graph directly exposed in front of you for instant use and reference. So, tear out the page bearing both. (The Answer Key and Diagnostic Chart pages have been perforated to permit removal.) This will make it easier to record your official answers onto it, to check the answers with the Answer Key, to refer to it as your eyes check back and forth during the corrective action, and to translate your comprehension percentage into a line--a graphic representation--on your Comprehension Graph.

SIX-WAY PARAGRAPHS

The Steps in a Nutshell

Here's how to get the most for your time and effort:

1. Title Scrutiny: Get from the title the meaning that the author put into it.
2. The Dot System: After your first fast reading, answer all of the questions with the unofficial dot.
3. The Check-Mark System: Reread the passage and, this time, put a check mark (✓) in a block to indicate your official answer.
4. The Diagnostic Chart: Record your official answer in the proper blocks of the Diagnostic Chart.
5. The Answer Key: Use your answer key in the way suggested on page 12.
6. Corrective Action: Investigate all incorrect answers. Reread the passage. Analyze your mistakes.
7. Graphing Your Progress: Record your comprehension score on the graph.

1. LOUIS BRAILLE, ALPHABET MAKER

It took a blind man to lead the way in devising a system that permits the blind to read. Louis Braille, a normal, healthy, French child at birth, became sightless when he was only three. At ten, he was placed in a home for the blind, a ward of society. But young Louis had great talent. He became a skilled musician. Soon he was appointed a church organist in Paris.

When he was twenty-five, he became a teacher of the blind. To help his students with their studies, he laboriously developed a crude alphabet of raised indentations on stiff paper so that his young flock could study both written and musical works. This, perfected, became the Braille system.

1. The passage is mainly about.
 - a. the Braille alphabet.
 - b. blind people.
 - c. Louis Braille.
 - d. the method permitting the blind to "see."

2. What is the main idea of the Passage?
 - a. Blind people can be quite talented and even become church organists.
 - b. Louis Braille was a blind man.
 - c. It was a blind person that developed a reading method for blind people.
 - d. Blind people can read.

3. You wouldn't expect that
 - a. Louis learned to read before he was blind.
 - b. Mr. Braille wanted to help the blind to read.
 - c. Braille was one of the most difficult alphabets to read.
 - d. every blind person can read Braille.

4. It is probable that
 - a. all blind people do read Braille.
 - b. sign language is more useful than Braille to the blind.
 - c. most students realized that Mr. Braille developed the Braille alphabet.
 - d. Louis Braille wouldn't have developed the alphabet if he had had perfect sight.

5. The author makes his point by
 - a. comparison and contrast.
 - b. negative arguments.
 - c. autobiographical observation.
 - d. a personal case study.

6. The best meaning of flock in this passage is
 - a. a group of sheep.
 - b. a number of blind students.
 - c. a number of wards of the society.
 - d. several blind musicians.

CATEGORIES OF COMPREHENSION QUESTIONS

- | | |
|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

2. ANCIENT FIRE FIGHTING

It may seem surprising, but the fact is that the fire engine goes back to the time of Christ. Caesar Augustus (63 B.C.-14 A.D.) formed the first fire department in Rome. Seven hundred firemen lived in firehouses throughout the city. They used a wheeled machine which squirted water on fires. This "water squirt" was a huge syringe. The bulb may have been as long as a man's body, and it was squeezed by means of a giant screw turned by a fireman. Such squirts--and even hand syringes three feet long--were in use when the Great Fire swept London in 1666. The hand squirts were held by two firemen while a third worked the plunger--much as you push the plunger in a garden spray gun today. It took the London fire--and great fires in other growing cities--to awaken people to the need for better equipment.

1. This passage is mainly about
 - a. fire engines.
 - b. the Great Fire.
 - c. types of fires.
 - d. firemen.

2. According to the author
 - a. water pumps are ancient fire fighting tools.
 - b. the Great Fire must have killed a lot of people.
 - c. the water squirt was an unsuccessful fire hose.
 - d. fires will never be prevented no matter what measures are taken.

3. Which of the following is not true?
 - a. The water squirt was used only in Rome.
 - b. Fire engines go back to the time of Christ.
 - c. Caesar formed the first fire department in Rome.
 - d. A water squirt is a huge syringe.

4. From this passage the reader could conclude that in 63 B.C.-14 A.D.,
 - a. a controlled method of fire fighting was necessary.
 - b. people wanted to prevent forest fires.
 - c. Augustus was a very smart man.
 - d. many lives were saved from fire.

5. In the paragraph the author uses which of the following?
 - a. Comparison
 - b. Surprising facts
 - c. Personal opinion
 - d. Common sense

6. One type of syringe described is a
 - a. water pail.
 - b. unique type of vacuum.
 - c. special type of hose.
 - d. tube with a piston that can draw or eject liquid.

CATEGORIES OF COMPREHENSION QUESTIONS

- | | |
|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

3. WHAT ABOUT FROST?

Wind--even the slightest of breezes--can prevent frost. That's because wind is like a spoon in your cup of tea: it stirs things around and brings down a lot of the warm air that often floats just above housetops and trees.

It may seem odd but ice itself sometimes can protect crops from frost! Some growers actually spray their crops with water on a freezing night. Water freezes quickly on the plants--and then a strange thing happens. As long as ice stays wet, it can't get colder than 32 degrees, a temperature many plants can stand. If the ice ever became entirely frozen and dry, it might drop many degrees lower, ruining the plants. But by continually spraying water on the ice, the growers keep it from going below 32 degrees even if the air is much colder. This may frustrate Jack Frost, but it saves the plants.

This strange kind of "ice blanket" works only on plants that are strong enough to stand the weight of frozen spray. The system is used even to protect banana plants on some Central American plantations.

1. The best title would be:
 a. Jack Frost Triumphs Again.
 b. Ice Can Be Nice.
 c. Battle of the Farmer.
 d. The Helpless Plant.
2. This passage is intended
 a. to explain why some plants can withstand ice.
 b. to show how ice forms.
 c. to give tips on preserving crops.
 d. to show that frost can be prevented.
3. Ice can save plants rather than destroy them if the plants are
 a. strong enough to support it.
 b. sprayed periodically.
 c. accustomed to frost.
 d. quickly defrosted.
4. It can be concluded from the passage that ice would not protect from frost
 a. banana trees.
 b. fir trees.
 c. delicate rose bushes.
 d. apple orchards.
5. The author writes his passage with the use of
 a. cause and effect relationships.
 b. personal opinions.
 c. arguments and proof.
 d. comparison and contrast.
6. As used in this passage, ice blanket means
 a. a cold blanket.
 b. a spray of frost.
 c. a covering of ice.
 d. a thermal blanket.

CATEGORIES OF COMPREHENSION QUESTIONS

- | | |
|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

4. THE MILLER'S PROBLEM

Early European windmills became a problem when winds reached gale force. Unless the canvas sails of the windmill were furled, the entire structure could be torn from its foundation and tossed on its side. Sea captains faced the same danger. Unless they trimmed their sails, the masts would squirm out of their sockets and tumble overboard. The captain could pipe his riggers aloft to shorten canvas, but the miller's task was not that simple. First, he had to shut down his mill. This was achieved by braking the wind shaft. The brakes were two wooden blocks called cheeks. If the cheeks were applied too quickly, the sails would come to an abrupt stop, and the wind would tear them to shreds. If the sails withstood the blast, the grindstone, stopping just as abruptly, could leap from its mounting and crash through the side of the mill, often taking life and limb.

Both dangers were removed by redesigning the sails. In place of canvas, wooden blinds were adopted, as modern window blinds control the passage of light, so the wooden mill blinds controlled the passage of air. If a storm arose, the blinds were opened and the blast passed harmlessly through the sails. If the winds were calm, the blinds were closed to capture every breath.

1. The best title for this selection would be:
 a. Designing Windmill Sails.
 b. Stopping Windmill Arms.
 c. The Problem of High Winds and Its Solution.
 d. Furling the Ship's Canvas.
2. The principal advantage of the wooden blinds in place of cloth sails was that
 a. the wood lasted longer than the cloth.
 b. the wood was heavier than the cloth.
 c. when wooden blinds were used, the cheeks were not necessary.
 d. the wooden blinds could adapt to wind conditions.
3. The brakes used to slow down the windmill shaft were called
 a. shoes.
 b. axles.
 c. cheeks.
 d. discs.
4. A windmill is similar to a sailing ship because
 a. both are wind powered.
 b. the sails of both are identical.
 c. both use wooden brakes.
 d. both use blinds to control wind flow.
5. The function of the second paragraph is
 a. to illustrate a point made in the first.
 b. to explain a solution to a problem raised in the first.
 c. to show what happens when the wind blows too hard.
 d. to illustrate why the windmill was never a very satisfactory device.
6. When a captain pipes his riggers aloft, he
 a. signals his crew.
 b. supplies his men with pipes.
 c. plays music.
 d. raises the mast automatically.

CATEGORIES OF COMPREHENSION QUESTIONS

- | | |
|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

5. A BEAN TAKES A BOW

In the wild state, cocoa trees grow from 25 to 40 feet tall. Under cultivation, they are kept pruned to a height of about 15 feet. They require a mean temperature of about 80 degrees and cannot stand direct sunlight, particularly when young. Usually they grow best in the shade of tall mango, banana, rubber, or breadfruit trees.

The trees bloom and grow pods throughout the year, although their yield is highest during two peak periods. Their five-petal blossoms are waxy pink and the color of the leaves ranges from pale rose to red and green. The silvery bark of the tree trunk adds even more color, as do clinging moss and rainbow lichens.

1. This passage deals mainly with the
 - a. cultivation of the coca bean.
 - b. pruning of the cocoa tree.
 - c. cocoa tee.
 - d. cocoa beans and tree.

2. The main idea of this passage is that
 - a. there are some distinct characteristics of the cocoa tree.
 - b. cocoa trees produce cocoa beans.
 - c. cocoa trees cannot stand direct sunlight.
 - d. it takes a great deal of work to produce coffee and cocoa.

3. When the author refers to the mean temperature, he is referring to the
 - a. temperature of the shade under the banana, mango, etc. trees.
 - b. temperature that the trees are made to grow in.
 - c. exact temperature necessary for cocoa trees to survive.
 - d. average temperature suitable for the growth of cocoa trees.

4. It is possible to conclude that the cocoa tree
 - a. must always be in a climate of 80 degrees.
 - b. has an improved yield when pruned.
 - c. grows under another tree to get the nutrients in the soil.
 - d. has been cultivated by men living only in the cocoa jungles.

5. The author develops his paragraph by using
 - a. comparison.
 - b. contrast.
 - c. arguments.
 - d. description.

6. To be kept pruned means
 - a. to be kept dried out.
 - b. to have the trunk scraped.
 - c. to be fertilized with prunes.
 - d. to have branches cut off.

CATEGORIES OF COMPREHENSION QUESTIONS

- | | |
|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

6. STAGECOACH HERO

As shipments of gold dust by stagecoach increased, so did attempts to waylay the coaches by gangs of highwaymen. Charley Parkhurst, a stage driver in California, who was widely known for his driving skill, was once stopped by highwaymen. Charley gave up the express box on demand and added, "I wasn't expecting this, but the next time you stop me I'll be ready for you." Charley was, too. Parkhurst shot the leader of the ill-starred gang that stopped his stage the next time and whipped his team right through the others, scattering them. What made Charley's feat all the more remarkable was revealed at his death in 1879. The doctor's death certificate showed that Charley, old rough-and-tumble Charley, was actually Charlotte Parkhurst.

1. The best title for this paragraph would be:
 a. The Dangers of Stage Travel.
 b. The Triumph of Charley Parkhurst.
 c. The Death of Charley Parkhurst.
 d. The Last Great Stage Robbery.
2. This paragraph illustrates that
 a. women would have made better stagecoach drivers.
 b. stage passengers were in great danger.
 c. gold shipments were often targets for theft.
 d. men "rode shotgun" to protect the driver.
3. The gangs of highwaymen wanted the
 a. express box.
 b. gold dust.
 c. passengers' cash.
 d. coach itself.
4. The main requirement for a stage coach driver was to be
 a. a man.
 b. a skilled driver.
 c. remarkable.
 d. a good shot.
5. The adjective "ill-starred" describes the gang's
 a. intentions.
 b. reputation.
 c. luck.
 d. skill.
6. As used in this passage, to waylay seems to mean
 a. to attack and capture.
 b. to chase and destroy.
 c. to attack from hiding and rob.
 d. to force to turn around and go back.

CATEGORIES OF COMPREHENSION QUESTIONS

- | | |
|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

7. THE LONG AND SHORT OF IT

The "rule of thumb" is no idle idiom. The early inch was the width of a man's thumb. In the fourteenth century, England's Edward II decreed it should be "three barley cords, round and dry, placed end-to-end lengthwise." He didn't say from which part of the ear the kernels should come, or how much they would be worn down at the end to make them "round," but the directions seemed sufficient for the needs of the day. A king, of course, could make such decrees and expect them to be reasonably followed. But where there was no central authority strong enough to set up standards and enforce their use and uniformity, a standardized system of weights and measures had little chance against the inconsistent arm and foot lengths of tribal chiefs.

1. This article is mainly concerned with
 - a. the decrees of Edward II.
 - b. round barley corns.
 - c. problems of measurement.
 - d. thumb widths.
2. Edward II recognized the need for
 - a. a standard inch.
 - b. his power to be absolute.
 - c. all of his decrees to be followed.
 - d. a process for rounding barley corns.
3. The author states that
 - a. thumbs were about an inch long.
 - b. barley corns were always the same size.
 - c. barley corns were all round.
 - d. not all chiefs were the same size.
4. Necessary to the development of standardized measures is
 - a. a strong central authority.
 - b. the rule set up by Edward II.
 - c. the use of barley corns.
 - d. uniform arm length.
5. To develop his point, the author uses
 - a. comparison and contrast.
 - b. arguments and proof.
 - c. historical facts.
 - d. common-sense knowledge.
6. The word inconsistent is closest in meaning to
 - a. systematic.
 - b. different.
 - c. unreasonable.
 - d. ridiculous.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

8. TASTY WEEDS

It's a rare person nowadays who can find the ingredients for an appetizing meal in an untilled field or a vacant lot. But that doesn't mean they aren't there. One of the most maligned of weeds, the dandelion, is a living supermarket. The leaves are delicious in salads, the golden blossoms make an interesting wine, and both the roots and leaves are used in medicines. (And children find it fun to blow the puffs of seed onto their neighbor's lawn!) Chicory, wild lettuce, and sheep sorrel also go well with French dressing, while curled dock, lamb's quarter, pigweed, and sow thistle add flavor and substance to a soup or stew. Many weed-eaters prefer lamb's quarter to spinach as a cooked vegetable. The evening primrose is a weed in the United States, but in England and Holland, where it is grown commercially, it is considered a delicacy.

1. This passage is mainly about
 a. untilled fields.
 b. using dandelions in salads.
 c. edible weeds.
 d. weeds used in cooking.
2. The dandelion is
 a. used most often in salads.
 b. considered a delicacy outside of the United States.
 c. one of many useful weeds.
 d. a favorite weed in supermarkets.
3. The dandelion is called a living supermarket because
 a. it grows in combination with other weeds.
 b. it is grown commercially.
 c. of its high nutritional value.
 d. of its many possible uses.
4. From the passage, the reader can conclude that the weeds mentioned are
 a. better tasting than most vegetables.
 b. not fatal if consumed.
 c. easier to pick than to buy from the store.
 d. more nutritious than most vegetables.
5. To make his main point, the author uses
 a. limited but good examples.
 b. complex reasoning.
 c. mostly his own opinions.
 d. detailed comparisons.
6. The word maligned, as used in the passage, means
 a. falsely undervalued.
 b. tasty.
 c. inexpensively grown.
 d. systematically destroyed.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

9. KNIVES, FORKS AND SPOONS

Knives and spoons were already in general use when forks were introduced to the general public in England only 250 years ago.

For a long time the use of forks was scorned. Men continued to eat with their fingers, calling forks effeminate. The English clergy even branded them as sacrilegious because they were a substitute for human fingers.

Nevertheless forks slowly gained acceptance. In those days forks usually had only two tines; these were long and dangerous-looking. If you would see what a Dutch table fork of 1650 looked like, open your cupboard and take out your carving fork. This is a throwback to early table forks, which, in turn, were throwbacks to a vicious twin-pointed battle spear. The four-tined forks that we know today did not come into general use until well over a century ago. As a matter of fact, the four-tined fork is about as new as the steam engine.

1. This article could best be titled:
 a. Tine and Tine Again.
 b. Fingers Are Better.
 c. The Fork Revolution.
 d. Man's Greatest Invention.
2. The fork
 a. was used in Anglican ceremonies.
 b. took Europe by storm.
 c. was invented by the Dutch.
 d. gained acceptance very slowly.
3. Dutch table forks
 a. were sometimes used as battle spears.
 b. were used only for carving.
 c. originally had only two tines.
 d. were more efficient than modern forks.
4. Forks
 a. are the "newest" eating utensils.
 b. used to be four-tined.
 c. are enjoying renewed popularity.
 d. are closely related to spoons.
5. The author uses
 a. unkind sarcasm.
 b. straightforward examples.
 c. critical remarks.
 d. deep insights.
6. The word throwback, as used in the passage, means
 a. an object which is able to return to the sender.
 b. something which bounces.
 c. an object originating in an earlier similar object.
 d. a valuable antique.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

10. APPLE CIDER

When apples are made into cider, they are first washed, and then fed into a grinder and reduced to a pulp which is called "cheese." In horse-and-buggy days most farms used mail-order hand-grinders. Nowadays, these are hard to come by, but for small batches a hand meat-grinder will do. In any case, the youngest and most energetic members of the crew can usually be induced to take over this phase of the operation.

The next and crucial step is to place the "cheese" in the press. When a simple hand screw-press is used, the apple pulp may be held in a slatted basket. In a cider mill's hydraulic press the "cheese" is placed in cloths on slatted frames which are stacked one upon the other. In either type the juice passes between the slats and is collected at the base of the press as cider.

The pressed pulp, called pomace, must be disposed of at once, for this pomace will attract every buzzing yellowjacket within miles.

1. This selection is mostly about apple cider and its
 - a. history.
 - b. usefulness.
 - c. production.
 - d. variety.

2. Basically, apple cider is made by
 - a. squeezing the "cheese" through a press and collecting the juice.
 - b. cutting the apples into pieces and soaking them in water.
 - c. boiling the juice out of the "cheese."
 - d. grating the "cheese" and letting the juice drip out naturally.

3. The pressed pulp is
 - a. made into cider.
 - b. used in baking.
 - c. thrown out.
 - d. squeezed a second time.

4. Cider pressing is
 - a. a fun sport.
 - b. a backbreaking task.
 - c. an involved process, using both people and machines.
 - d. an interesting and unusual way of preserving apples.

5. The author explains cider pressing through
 - a. a series of images.
 - b. a description of the process.
 - c. an explanation of its history.
 - d. a set of examples.

6. The pomace of an apple is the
 - a. leftover cores.
 - b. sweet smell.
 - c. pressed pulp.
 - d. mass of stems and skins.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

11. RUDOLPH'S RUGGED RELATIVES

Lapland is not a recognized country. It is a large area north of the Arctic Circle made up of sections of Norway, Sweden, Finland and Russia. It has no government of its own. In this flat, marshy, almost treeless land where the sun doesn't set for three months of the year, where it never rises for another three, the Lapp herdsman and his reindeer live much as they have lived for hundreds, even thousands of years. It is the Lapp who, over the centuries, has tamed the reindeer. For as the reindeer went northward, following the moss, so the prehistoric Lapp hunters followed the herds. The Lapps originally came from each of the Urals, in Russia, and a few thousand years later were followed by the Finns, over the same route. Being more advanced culturally, and an agricultural people, the Finns gradually forced the Lapps farther and farther into the icy wastes of northern Norway, Sweden, Finland and Russia; the Lapps, in their own language, called themselves "the banished." The four groups of Lapps are closely connected racially, wear similar costumes, and live, as they have for centuries, almost wholly on the reindeer. Each of the three Scandinavian countries has respected their unique, almost Stone Age culture, and, though governing them, has left them to develop very much along their own lines.

1. The best title for this selection could be:
 a. Persecution of the Lapps.
 b. The Reindeer of Lapland.
 c. Migration of the Lapps.
 d. The Culture of Lapland.
2. The single most important factor in distinguishing the Lapps from their neighbors is their
 a. advanced form of agriculture.
 b. almost primitive lifestyle.
 c. skill in hunting reindeer.
 d. primitive language.
3. The Finns and Lapps share a common
 a. language.
 b. style of dress.
 c. culture.
 d. origin.
4. The government of Lapland can best be described as
 a. independent of Scandinavian influence.
 b. dominated by Communist influence.
 c. fairly democratic.
 d. virtually nonexistent.
5. The author mentions the migration of the Finns in order to explain the Lapps'
 a. living in the far north.
 b. dependence on reindeer.
 c. Stone Age culture.
 d. racial connection to them.
6. The word banished, as used in this passage, is closest in meaning to
 a. hopeless.
 b. forsaken.
 c. expelled.
 d. persecuted.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

12. A NEW WAY TO PLOW?

Over 100 years ago on a day late in 1859 the great test came. In those days of ox-drawn plows farmers were accustomed to spending an entire day plowing a single acre. An acre, in fact, had originally been defined as the amount of land a farmer could plow in a day.

On the day of the test a thousand farmers left their oxen at home and gathered in a field near Lancaster, England, to hoot or cheer while Fawkes' great "field locomotive" was fired up. Fawkes sat at the controls, gave two toots of the whistle and opened the throttle. The contraption, which looked like a monster iron smokestack on wheels, began to move. Ridicule turned to awe. Rapidly it gained speed and soon the coal-fired steam locomotive was racing across the field faster than men would walk. And the farmers saw that it was pulling not one "bottom" as plowmen call their plows, but eight.

Farmers couldn't believe their eyes. Fawkes plowed an acre in twelve minutes flat. Even today that's an amazing performance. A farmer pulling three bottoms behind a modern tractor allows about two and a half hours for plowing an acre.

Fawkes' wonder was too big, too costly, and too hard to repair. Its great weight packed the fields too tight, and it fell into mudholes. Thus it failed.

1. The best title for this selection would be:
 - a. The Field Locomotive.
 - b. The Power-Driven Cultivator.
 - c. Ox-Drawn Plows.
 - d. The Failure of Steam Plows.

2. The invention of the steam-driven locomotive capable of pulling a number of bottoms or plows was significant because
 - a. it did more work in less time.
 - b. it did not require men to operate it.
 - c. it was not operated by hand.
 - d. its design was perfect.

3. Which of the following factors was not responsible for the failure of the steam-driven field locomotive?
 - a. Its weight
 - b. Its size
 - c. Its speed
 - d. Its price

4. The fact that tractor-drawn triple plows are used today suggests that compared to steam-driven field locomotives, modern tractors
 - a. are more efficient.
 - b. are not so powerful.
 - c. do more in less time.
 - d. are easier to run.

5. The author mentions the modern farmer's output to show
 - a. how advanced the modern farmer is.
 - b. the difficulty of a farmer's work.
 - c. the relative power of the field locomotive and today's tractor.
 - d. how efficient the farmer has become.

6. As used in this selection, contraption seems to mean
 - a. well-designed machinery.
 - b. imposing mechanical device.
 - c. unusual and odd-looking machine.
 - d. useless pile of junk.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

13. A LINE ON KITES

Actually, there are four basic types of kites: flat, bowed or angled, nonrigid, and novelty kites.

The flat kite, the simplest of all, is the only kite that requires a tail. Without a tail made of knotted strips of cloth, ribbon, or stringed paper, a flat kite would loop and dive erratically--if it stayed in the air at all.

Americans are more familiar with bowed and angled kites. The basic bowed kite is a four-sided, diamond-shaped kite made of paper or cloth stretched on a cross-frame of softwood sticks. The shorter stick is bent and tied into a bow. The box kite is one of the most common of the angled kites. It consists of a rectangular, box-shaped frame of wood with a wide band of cloth or paper at each end. The midsection of the box is open. Bowed kites are used much more than box kites in this country. Few of the many other types of bowed or angled kites are ever flown--not even the tetrahedral kite, which was invented by a famous American, Alexander Graham Bell.

The nonrigid kite has only recently joined the ranks of high-flyers in this country. Any kite without a rigid framework qualifies, although parachute-shaped models seem to have the edge.

Novelty kites are most popular in the Orient. By adding extra branches to the wooden frame, attaching decorations, and cutting designs in the surface, kites are made to look like birds, fish, dragons, and even people.

1. The passage is essentially a
 - a. description of the four basic types of kites.
 - b. guide to kite-flying.
 - c. history of kite development.
 - d. scientific analysis of the mechanism of flight.

2. In this passage the author tries to
 - a. explore the many kinds of problems involved in kite-flying.
 - b. explain the different constructions of the four types of kites.
 - c. give an explanation for the popularity of kite-flying.
 - d. invent a colorful new way to build a kite.

3. The box kite consists of a
 - a. nonrigid parachute-like design.
 - b. diamond-shaped model made of paper or cloth stretched on wooden sticks.
 - c. box decorated with designs.
 - d. rectangular box-shaped frame of wood with a wide band of cloth or paper at each end.

4. We can conclude from this section that most Americans prefer to fly a kite that is
 - a. flat.
 - b. bowed or angled.
 - c. nonrigid.
 - d. novelty.

5. The author explains the differences among the four kinds of kites through the use of
 - a. description.
 - b. analogy.
 - c. incident.
 - d. similarity.

6. For a kite to fly erratically it would have
 - a. to fly a straight course.
 - b. to loop and dive strangely.
 - c. to soar very high.
 - d. to rip in mid-flight.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

14. RIDING THE DESERT CAMEL

The back of a camel is too broad to let both of the rider's feet hang down--and there are no stirrups. The easiest way to ride, according to camel drivers, is to wrap one leg around the tall saddle horn and tuck the foot beneath the other leg which is allowed to dangle. You can also wrap both legs around the horn and sit indian fashion, rest one or both legs on the camel's neck, ride sidesaddle, or even kneel back with the feet stuffed into the saddlebags. As for your hands, you can hold the reins gently, grasp a camel stick or clutch the saddle horn in desperation. But once you are accustomed to the camel's constant rocking gait, you can almost be lulled to sleep.

1. Choose the best title for this selection.
 a. How to Ride a Camel
 b. The Uncomfortable Camel
 c. Riding in the Desert
 d. Camel Drive
2. The author's main point is that riding a camel
 a. demands patience.
 b. is impossible.
 c. requires ingenuity.
 d. is dangerous.
3. According to the passage, which of the following statements is not true?
 a. There are no stirrups to assist the camel rider.
 b. Camels have a wider girth than horses.
 c. Camels can be ridden sidesaddle.
 d. The constant rocking of camels causes motion sickness.
4. We can conclude that the rider is supposed
 a. to practice riding the animal.
 b. to get used to the camel's gait.
 c. to watch the camel drivers.
 d. to find his most comfortable position.
5. The content of this paragraph can best be described as
 a. argumentative.
 b. descriptive.
 c. critical.
 d. instructive.
6. As used in the paragraph, lulled most nearly means
 a. serenaded.
 b. soothed.
 c. shaken.
 d. shocked.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

15. CARRYING OIL

Not much is known about the cargo ship, Elizabeth Watts. She carried the world's first really substantial cargo of oil and arrived safely in England forty-five days later. Beyond that the records are blank--except to note that the ship's master had considerable difficulty in recruiting a crew. Sailors, not unreasonably, balked at signing on with a ship that was quite likely to explode and burn to the waterline halfway down the Delaware River. The master of the brig had to take drastic measures. He canvassed the inns, plied the sailors with grog and gently guided their staggering steps up the gangway. By the time they woke the ship was scudding into the Atlantic under full sail.

Today such tactics undoubtedly seem extreme. Yet they suggest the kind of problems that were to confront ship-owners, as in the last half of the nineteenth century, they began, with considerable uneasiness, to cope with this new, unpredictable and often deadly cargo.

1. This passage is primarily about
 - a. the Elizabeth Watts.
 - b. difficulties of ships carrying oil.
 - c. travels over the Atlantic.
 - d. problems arising in some sailing cruises.

2. The main thought of this passage is
 - a. early tankers used to explode and burn.
 - b. with a cargo of oil, a shipowner faced several problems.
 - c. oil is extremely explosive on the seas.
 - d. people in general are afraid of oil.

3. According to the selection
 - a. the Delaware River was a dangerous area for ships to pass.
 - b. the Elizabeth Watts carried the first good-sized cargo of oil.
 - c. sailors today don't fear oil explosions.
 - d. early sailors met their death on ships carrying oil as cargo.

4. After reading the passage, the reader may conclude that
 - a. the Elizabeth Watts might have sailed in the late 1860s.
 - b. the oil supply was limited because people would not work on ships.
 - c. all shipowners had to be wicked people in order to get a crew.
 - d. the average trip to England by boat takes forty-five days.

5. The author develops his main idea in the paragraph by using
 - a. conversation and dialogue.
 - b. an historical example.
 - c. common problems of sailing.
 - d. arguments and proof.

6. The best meaning of the word balked is
 - a. discussed at length.
 - b. stopped short, hesitated, or refused.
 - c. fearful.
 - d. extremely disgusted.

CATEGORIES OF COMPREHENSION QUESTIONS

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|---------------------------|------------------------------|
| No. 1: Subject Matter | No. 4: Conclusion |
| No. 2: Main Idea | No. 5: Clarifying Devices |
| No. 3: Supporting Details | No. 6: Vocabulary in Context |

MATERIALS USED BY STRATEGY GROUP

STUDENT WORKSHEET #1

For each of the following word groups, arrange the words from most general level to most specific level. Please indent to show that one word is more specific than another.

Example: Cars
 Ford
 Mustang

If any of the words within a group seem to be at the same level, show this by listing them directly below one another.

Example: Cars
 Ford
 Chevrolet

WORDS GROUPS:

- | | | |
|----|---|-------------------------|
| 1. | musician
organist | _____
_____ |
| 2. | deaf
blind
handicaps | _____

_____ |
| 3. | fire truck
fire department
water hose | _____

_____ |
| 4. | wind
frost
weather conditions | _____

_____ |
| 5. | water
ice | _____
_____ |
| 6. | talent
music | _____
_____ |
| 7. | ship
mast
sail | _____

_____ |

8. cocoa trees _____
prune _____
cultivate _____
9. temperature _____
eighty degrees _____
daytime _____
10. flower _____
petal _____
blossom _____
garden _____
11. stagecoach _____
stage driver _____
gold shipment _____
shipping _____
passenger _____
12. measures _____
inch _____
foot _____
yard _____
13. dandelion _____
vacant lot _____
weeds _____
leaves _____
14. spoons _____
eating _____
utensils _____
knives _____
forks _____

STUDENT WORKSHEET #2

For each of the following phrase groups, arrange the phrases from most general level to most specific level. Please indent to show that one phrase is more specific than another.

Example: East and West
 Crusades Fought
 Thousands of Casualties

If any of the phrases within a group seem to be at the same level, show this by listing them directly below one another.

Example: East and West
 Crusades Fought
 Cultural Exchanges

PHRASE GROUPS:

- | | | |
|----|--|---|
| 1. | Braille system
raised indentations
reading methods | _____

_____ |
| 2. | broad back
desert camel
rocking gait
difficult to mount | _____

_____ |
| 3. | flat kite
novelty kites
bowed kite
nonrigid kite | _____

_____ |
| 4. | country of Lapland
north of Arctic Circle
Lapp people
different languages
same customs | _____

_____ |
| 5. | plowing dirt
acre of land
farmer's work
twelve minutes flat | _____

_____ |

6. kite flying _____
recreation _____
car racing _____
outdoor location _____
indoor location _____
card playing _____
7. oil shipment _____
large cargo ship _____
dangerous mission _____
8. penguins _____
non-flying birds _____
uses flippers _____
races under water _____
sixty miles per hour _____
9. American woodchuck _____
strange animals _____
large appetite _____
lives in ground _____
eats 1/2 ton of alfalfa _____
10. different colors _____
birds' eggs _____
ducks' green _____
plover's drab flecked _____
various shapes _____
11. target bows _____
modern bows and arrows _____
hunting bows _____
12. quality of a diamond _____
free from flaws _____
measured in carats _____
carbon spots _____
thin cracks _____
total weight _____
13. bee experts _____
entomology _____
queen bee growth cycle _____
eight days of pupal change _____
sixteen days from eggs _____
14. East and West History _____
military viewpoint _____
cultural viewpoint _____
two hundred years of war _____
art contributions _____

STUDENT WORKSHEET #3

For each of the following sentence groups, arrange the sentences from most general level to most specific level. Please indent to show that one sentence is more specific than another.

If any of the sentences within a group seem to be at the same level, show this by listing them directly below one another.

SENTENCE GROUPS:

1. Logs were used to roll things.
 Solid wheels were first cut from tree trunks.
 The wheel was probably developed in logical steps.
 Metal replaced wood to keep wheels from getting lopsided.

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2. Camels store water in humps.
 Animals required to take long waterless marches.
 Water is stored in fat molecules.
 Animals must adapt to the desert.
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3. Freshmen could not usually wear a hat.
Hats could be worn in the snow.
Colleges were different in colonial days.
If both hands were full, one could wear a hat.
They often took upperclassmen's clothes to be pressed.
Freshmen waited on upperclassmen.
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4. Secretaries make a list of office workers' favorite tunes.
Businesses take a midmorning break in Amsterdam.
Street musicians roam beneath office windows.
Secretaries deliver coins and list of tunes.
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5. Background knowledge in language is needed.
One man archeology expeditions are rare.
Extensive knowledge in different cultures is required.
Experts in photography and drafting must be included.
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6. Ferries are not used much nowadays.
Ferries were a common sight years ago.
Alternate traffic routes have been provided.
Bridges were not common.
More bridges have been built.
They provided the only dry crossing in many areas.
The use of ferryboats has changed over the years.
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-
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7. Sea shells are external skeletons.
Soft marine animals need protection.
Shells are made of stone-hard material.
Three layers are usually found in a shell.
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-

STUDENT WORKSHEET #4

For each of the following sentence groups, arrange the sentences from most general level to most specific level. Please indent to show that one sentence is more specific than another.

If any of the sentences within a group seem to be at the same level, show this by listing them directly below one another.

SENTENCE GROUPS:

1. Seven hundred firemen lived in firehouses throughout the city.
 Caesar Augustus formed the first fire department in Rome.
 They used a wheeled machine which squirted water on fires.
 Such squirts were still in use when the Great Fire swept London in 1666.

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2. The frozen spray forms an "ice blanket".
 Some growers actually spray their crops with water on a freezing night.
 Ice can sometimes protect crops from frost.
 Water freezes quickly on the plants.
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3. Unless the canvas sails of the windmill were furled, the entire structure could be torn from its foundation and tossed on its side.
Early European windmills became a problem when winds reached gale force.
The miller had to shut down the mill by braking the windshaft.
The brakes were two wooden blocks called "cheeks".
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4. The leaves are delicious in salads.
The golden blossoms make an interesting wine.
Both the roots and leaves are used in medicines.
One of the most maligned of weeds, the dandelion, is a living grocery store.
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5. The English clergy branded them as sacrilegious because they were a substitute for human fingers.
Forks were introduced to the general public in England only 250 years ago.
In those days forks usually had only two tines; these were long and dangerous-looking.
Early table forks were throwbacks to a vicious twin-pointed battle spear.
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6. The giving of a blue ribbon for first prize originated with the English knights.

Awards seem to demand ribbon.

The highest order of knighthood, the Order of the Garter, was represented by a wide sash of blue.

A red ribbon for second prize was inspired by the second order of knighthood, the Order of Bath, represented by a crimson sash.

7. Authorities believe that he held chunks of meat in his mouth, slicing off what he didn't want to swallow.

Man was making and using stone knives 45,000 years ago.

During the Middle Ages in Europe, man used his hunting knife to separate himself from his steak.

The knife is probably far older than either the fork or spoon.

STUDENT WORKSHEET #5

36. CORAL DWELLERS

Living in the shelter of the reefs, in the quiet haven of coral forests beneath the windblown surface, countless varieties of brilliantly colored, almost fluorescent coral fish swim lazily through the branches. Among the loveliest are the bizarre "angel" or "butterfly" fish. Their Latin name means "bristle-toothed." Angel fish have a long, trunk-shaped mouth which enables them to pick up their food from the coral. They are not very good swimmers but luckily, like most brightly colored coral fish, they do not taste good either, so few carnivorous species ever harm them. They have practically no enemies, in fact, except members of their own species who sometimes try to penetrate their living areas. For a long time the fantastic colors and designs of these fishes were a riddle to scientists, but today the glowing dots and stripes are believed to be a kind of signal to warn others of the species away from their living areas.

STUDENT WORKSHEET #6

37. EARLY MEASURES

When life was rugged and simple, man's needs were few and he could supply them all. As he advanced from lone hunter to farmer and builder and exchanged a solitary existence for the greater comfort and security of community life, he realized he must come to an agreement with his neighbors on a common system of measurement. How can men build a house, or a storage hut, or a temple, unless all the builders use the same basic measurements?

The very earliest measurements were for length. The bases for the measures were those most natural--a foot, a palm, a span of the hand. When building alone, man could use his own body. But on community projects a common standard was required. The leader's measurements were taken and marked off on a stick or stone. Crude copies were made from the original and passed out for use. Later the foot gradually evolved to become twelve inches long.

STUDENT WORKSHEET #7

38. THE PLEASING PENGUIN

There is distinguished evidence that penguins enjoy some types of music. The polar explorer Robert F. Scott noted that penguins would always "come up at a trot" when his men were singing, and he says that several of his men could frequently be found on the deck of the ship singing before an "admiring group of penguins." Sir Ernest Henry Shackelton observed the same thing. But apparently penguins are somewhat priggish about their music. A phonograph was put out on the ice, and soon a crowd of penguins gathered around, and apparently listened with pleasure and interest. This continued for a time, but when the music, which had been sedate, became frivolous, the birds began to be uneasy. Then the record was changed to "Waltz Me Around Again, Willie." This was too much for the penguins. For a moment, a moment only, the birds waited; then, with one mind they turned, squawking disgustedly, and went off. Their ancient dignity had been profaned.

STUDENT WORKSHEET #8

39. SAY IT WITHOUT WORDS

Milady of a few centuries ago had a deuce of a time getting the word to a prospective suitor past a hovering chaperone unless she--and he--knew the flirt-fan routine. The array of signals grew into a most involved series of intricate gestures. By seemingly small, innocent movements of her fan, milady could relay to the gentleman when and where she could meet him, and might be with her, or whether or not she was in love with him.

This type of sign language had a reincarnation only a few years ago with the bobbysoxers. The thick short socks worn straight up meant the wearer was open for a date. One fold signified she was going steady, and rolled down meant taken, so stay away. Beads also have been used to indicate similar translations. Knotted at the neck the beads had the same meaning as rolled-down bobbysocks--"dated." But unknotted and hanging free, the beads said the wearer was available.

STUDENT WORKSHEET #9

40. LONG MAY IT LEAN!

The Spanish city of Zaragoza once possessed a bell tower of exceedingly beautiful design dating back to the 16th century. The Torre Nueva was known throughout the world for its architectural perfection. Soaring almost 300 feet into the air, and faced with delicate stone tracery, it stood in a populated part of the city, surrounded by small shops and homes. But it began to decline slowly following its completion. By 1847, the tower had reached a menacing nine-foot lean and people who lived and worked under its looming threat petitioned the city to have it taken down. But so proud were the Zaragozans of the Torre Nueva and its link with the city's long history, that opposition quickly arose. The controversy dragged on for almost 50 years.

In 1893 the decision was reluctantly made that, for safety's sake, the ancient shaft would have to be demolished. Stone by stone, the Torre Nueva disappeared, until no physical trace of it remained. Today, it exists only in the memories of the people, who still regret that some way could not have been found to preserve it.

STUDENT WORKSHEET #10

41. PALMYRA: ANCIENT CITY

Palmyra, an ancient city in Syria, was once nothing but a mud-hut oasis called Tadmor, a tiny village at the junction of two great trading routes. Then King Solomon erected a temple there to direct the wealth of the far-off east toward his kingdom. But Tadmor remained an obscure desert outpost until just prior to the birth of Jesus. Then, suddenly, with a shift in world powers, Palmyra began to grow.

Almost midway in the desert, 150 miles from Damascus and 190 miles--four day's journey by swift camel--from the Euphrates, it lay on the shortest route between the Phoenician coastal towns that gathered the rich merchandise of the western world and the Mesopotamian cities that commanded the fabulous eastern trade. To the west stood the mighty empire of Rome; to the east, the savage Parthians. Neither felt confident enough to wage war against the other. Swiftly, almost like a boom town privileged by both sides, Palmyra waxed rich and important as a trading center, a balance wheel and bulwark between two hesitant enemies.

STUDENT WORKSHEET #11

42. OASIS FRUIT

Probably the oldest known cultivated tree, the date palm has always seen yeoman service especially in the Arab Middle East where it is believed to have originated. Its fruit, the date, is a staple food. Dates can be eaten raw, cooked, baked into cakes or pressed into a delicious syrup that Arabs relish. Rich in carbohydrates, dates contain little fat and about 40 calories an ounce. The longevity of many Bedouins of the desert lands has been attributed, at least in part, to the nutritional benefits of the date, which ranks so importantly in their diet.

Its use as a food source accounts for only one asset of the date palm. The trunk makes excellent house-building timber; the mid-ribs of the larger leaves go into furniture and into crates--for shipping dates! The leaflets of the tree are woven into baskets and floor mats; the fibrous portions of the trunk supply rope; the larger fronds are braided into fences, erected to break the advance of sand dunes. Even the stones of the date do not go unused. Crushed, they are fed to livestock as fodder.

STUDENT WORKSHEET #12

43. FABRIC FROM THE PAST

There's no doubt that primitive mankind first trod the world without the benefit of clothing. Historians suggest that thousands, perhaps millions of years passed before animal skins became fashionable. Then, sometime in the dim past, man discovered that the hair of certain animals pressed together stayed together. The fabric known as felt replaced animal skins. No one knows the age of felt--only that it was in use long before Neolithic man learned how to weave cloth a mere twelve thousand years ago.

The manufacture of felt is simple. Seen through a microscope, the hair of many animals appears as a barbed strand, the barbs all pointing toward the tip of the hair. When a number of hairs are pressed together, those which lie in opposite directions interlock barbs and resist efforts to pull them apart.

Legend has it that St. Clement (patron saint of felt makers) discovered felt when, at the beginning of a long journey, he put carded wool between his feet and the soles of his sandals. When he reached his destination, he found no carded wool in his sandals. The wool had been compressed into felt.

APPROVAL SHEET

The dissertation submitted by Martha E. Casazza has been read and approved by the following committee:

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The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

April 15, 1988

Date

Judith W. Irwin

Director's Signature