The Relationship Between Field Dependence, Success In Reading, And The Processes Students Employ In Reading And Comprehending Text.

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The relationship between field dependence, success in reading, and the processes students employ in reading and comprehending text

Becker, Jane, Ed.D.

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U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

THE RELATIONSHIP BETWEEN FIELD DEPENDENCE, SUCCESS IN READING, AND THE PROCESSES STUDENTS EMPLOY IN READING AND COMPREHENDING TEXT

by

Jane Becker

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Professor in Charge

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Special Committee directing
the doctoral work of
Jane Becker

Dr. Joseph P. Kender, Chairman
Professor of Education

Dr. Herbert Rubenstein
Professor of Education

Dr. Alfred J. Castaldi
Professor Emeritus of Education

Dr. Edward E. Lotto
Assistant Professor of English

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TABLE OF CONTENTS

LIST OF TABLES

Table Page

List of Figures

THE RELATIONSHIP BETWEEN FIELD DEPENDENCE, SUCCESS IN READING, AND THE PROCESSES STUDENTS EMPLOY IN READING AND COMPREHENDING TEXT

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An Abstract

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Abstract

This descriptive study identified and compared the thought processes college developmental students used when reading. Sixteen subjects were chosen on the basis of cognitive style and reading proficiency. The Group Embedded Figures Test was used to measure cognitive style. Subjects who scored 11 or above on the GEFT were considered field independent; those who scores 6 or below were considered field dependent. The Nelson Denny Reading Test was used to identify "good readers," and "difference poor readers," whose NDRT Vocabulary scores were similar to those of the good readers but whose comprehension scores were at least three grade levels below their vocabulary scores.

Subjects trained in a thinking-out-loud procedure read three experimental passages from developmental reading texts. After silently reading each sentence, they verbalized their thoughts. An adaptation of Lytle's classification system was used to analyze the transcribed protocols. Analysis was focused on groups defined by either cognitive style or reading proficiency; on subgroups defined by both cognitive style and reading proficiency; and on individual subjects.

Although the difference was not significant, the field independent readers produced more "moves," or verbal responses, than those who were field dependent. Good and

difference poor readers produced about the same number of moves. Individual subjects varied widely on the number of moves made. Because between passage correlations of categories of moves were generally highest for the difference poor readers, that group was seen as the least flexible in processing of text.

Subgroups differed primarily in the number of moves made; field independent difference poor readers produced the greatest number of moves, while the field dependent difference poor readers produced the fewest. This was seen as further evidence that amount of verbalization is more related to cognitive style than to reading proficiency.

Individual readers' responses to several textual features gave indication that type of response may be related to either cognitive style or reading proficiency, depending on the specific feature. Case studies supported the conclusion that readers vary widely in their approaches to reading the same materials.

CHAPTER ONE

STATEMENT OF THE PROBLEM

Glaser (1981) points out that "we are over the threshold in the transition from education as a highly selective enterprise to one that is focused on developing an entire population of educated people" (p. 924). This trend has a number of implications, according to Glaser, including the need to move from testing for the purposes of selection and admissions decisions to testing designed to provide "information on individuals that is oriented toward instructional decisions rather than prediction. . . . The test and the instructional decision should be an integral event" (p. 924). According to Shore (1986), "Measured intelligence, aptitude, achievement, or creativity test scores . . . do not tell us how the individual thinks to get the score: Different individuals can get the same scores, even perfect scores, by alternate thinking and memory processes. The principle goals of cognitive research are to uncover, model and explain these different processes" (p. 24).

Numerous researchers have worked on ways to study the processes whereby responses are formulated. The study of eye movements has proved to be a productive way of inferring much about the reading process. To a lesser extent, some researchers have been engaged in the analysis of verbal

protocols elicited from readers in order to gain further insights into the highly complex mental activity of reading. Today college "developmental students" who have been labelled "high risk" students because of past performance and/or poor standardized test scores on college entrance examinations are among the group that are entering colleges in greater numbers as part of that movement to develop that "entire population of educated people" spoken about by Glaser (1981). Therefore, it is incumbent upon researchers to use whatever tools are available in order to understand and respond to the cognitive processes of this group of students in ways that will help them correct "underlying misconceptions . . . or incomplete knowledge" (Glaser, p. 926) that lead to errors in reading comprehension.

Various means of differentiating readers have been used separately in educational research. Among these is the concept of field dependent and field independent cognitive styles and their educational implications, frequently associated with the work of Witkin, Moore, Goodenough and Cox (1977). Davey (1983) and Annis (1979) have been among the researchers who have directed study towards the understanding of the role of field dependence in reading. Some research has indicated that whether a reader is an active or passive reader is related to his level of field independence/dependence (Goodenough, 1976). Secondly, the idea of classifying poor readers into distinct types, such

as the difference poor reader and the deficit poor reader has been proposed by Cromer (1970) who characterized the difference poor reader as one whose phonics skills and vocabulary skills are adequate but for whom there "is a mismatch between the individual's typical mode of responding and the pattern of responding necessary for adequate reading to occur" (p. 471). Isakson and Miller (1976) have also supported the idea that some readers have comprehension problems without decoding problems. Perhaps further insights into the reading process can be gained by using both the theory of field dependence and the concept of classification as a difference poor reader in consort. This study sought to examine the relationships of field dependence, reading skills classification (good versus difference poor), and the cognitive processes readers use when reading prose.

Definition of Terms

Field Dependence--"The extent to which the subject perceives part of a field as discrete from the surrounding field as a whole, rather than embedded in the field; or the extent to which the organization of the prevailing field determines perception of its components; or . . . the extent to which the person perceives analytically" (Witkin et al., 1977, pp. 6-7). Field dependent subjects were those who scored between zero and six (0-

6) on the Group Embedded Figures Test. Field independent subjects were those who scored between eleven and seventeen (11-17) on the Group Embedded Figures Test.

Good Reader--a student who scored at or above grade level 12 on both the Vocabulary and Comprehension sections of the Nelson Denny Reading Test.

Difference Poor Reader--a student who scored at or above grade level 11.7 on the Vocabulary section of the Nelson Denny Reading Test but three or more grade levels below the Vocabulary grade level (and not higher than 10.8) on the Comprehension section of the Nelson Denny Reading Test.

Protocol Analysis--examination of a reader's verbalizations while engaged in a thinking-out-loud reading process in order to infer the processes the reader uses while attempting to comprehend written material.

Move--"The term adopted to refer to verbal responses by readers to sentences in the text. Moves correspond to readers' statements or questions and not to one consistent linguistic unit of analysis. They refer to what the reader is doing as he/she makes his/her way through the text sentence by sentence, hence the designation as verbs of process with no evaluative connotations" (Lytle, 1982, p. 17).

Strategy--"Goal-directed segments or sequences (of moves)" (Lytle, p. 17).

Style--"The overall pattern of an individual's moves and strategies within and across texts: (Lytle, p. 18).

Purpose of the Study

The purpose of this study was to descriptively analyze the processes developmental college students employ while reading to determine what relationships exist between those processes, field dependence, and reading competency. To accomplish this, the study was divided into three parts. The first section addressed the population and the four groups, good readers, difference poor readers, field independent readers, and field dependent readers. For this section, five research questions were asked:

1. What is the relationship between college freshman developmental students' scores on the Group Embedded Figures Test and a standardized measure of reading proficiency (the Nelson Denny Reading Test) by which readers can be classified as good readers or difference poor readers?

2. Are there differences in the frequency of the various moves readers make while processing text that are related to being field independent versus field dependent?

3. Are there differences in the frequency of the various moves readers make while processing text that are related to being a good versus difference poor reader?

4. Do readers with similar cognitive styles but different reading proficiencies exhibit consistent patterns of moves when reading different materials?

5. Do readers with similar proficiencies but different cognitive styles exhibit consistent patterns of moves when reading different materials?

The answers to these questions were used as indicators of the separate effects of reading competency and field dependence on reading processes.

The second part of the study addressed the reading processes used by the four subgroups of readers who were classified according to their field dependence and reading scores combined: field independent good readers, field independent difference poor readers, field dependent good readers, and field dependent difference poor readers. Four research questions were asked relating to these subgroups:

1. How do field independent good readers compare to field independent difference poor readers in the processes they use when reading?

2. How do field dependent good readers compare to field dependent difference poor readers in the processes they use when reading?

3. How do field independent good readers compare to field dependent good readers in the processes they use when reading?

4. How do field independent difference poor readers compare to field dependent difference poor readers in the processes they use when reading?

The third part of the study explored the relationship of field dependence and reading proficiency to individual subjects. Two questions were asked relating to the individual subjects:

1. Do individual readers employ characteristic patterns of moves which might be considered comprehension styles?

2. How do reading proficiency and cognitive style relate to comprehension style?

These questions sought to determine whether the generalizations made in reference to the groups and subgroups in the first two parts of the study actually applied to the individual readers in the study and, if so, to what extent did they apply. Brief analysis of each subject's patterns and more detailed case studies of four subjects, one from each subgroup, provided the vehicle for addressing those questions.

CHAPTER TWO

REVIEW OF THE LITERATURE

The current study uses protocol analysis to assess the relationship of field dependence to the reading processes used by good and difference poor readers. Therefore, this review of the literature will focus on three topics. First, an introduction to the concept of field dependence will be provided and studies that have addressed the role of field dependence in reading and learning will be reviewed. Secondly, the concept of "good readers" versus "difference poor readers" will be discussed. Finally, the literature on protocol analysis will include a review of the debate over protocol analysis as a method for studying the reading process and a discussion of research studies that have used this technique for learning about how readers interact with text.

Field Dependence and Its Relationship to Reading and Learning

The concept of cognitive style has received a great deal of attention as researchers have sought to understand how people learn and how to work most productively with individual students. Witkin (1949) first introduced the concept of field dependence-independence, the most widely studied measure of cognitive style. The field dependence

continuum is referred to by Witkin, Moore, Goodenough, and Cox (1977) as ". . . the extent to which the organization of the prevailing field determines perception of its components; or, to put it in everyday terminology, the extent to which the person perceives analytically" (p. 7). These individual differences are viewed as an "articulated-global continuum" (p. 9). At one end of the continuum, the field independent person ". . . experiences in an articulated fashion (and therefore) tends to perceive items as discrete from background, when the field is organized, and to impose structure on a field, and so perceive it as organized, when the field has relatively little inherent structure" (p. 10). At the other end of the continuum, the field dependent experience is more global in that "it accords with the overall character of the prevailing field as given, and involves less intervention of mediators, such as analysis and structuring" (p. 10). This theory is pertinent to the study of reading because, "The articulated-global concept is applicable to the processing of information both from an immediately present stimulus configuration, as in perception, or from symbolic material, as in intellectual functioning" (p. 10).

As researchers have attempted to understand the relationship between field dependence-field independence and learning, they have focused considerable attention on the effects of field dependence on reading performance.

Although early research produced mixed results, there has been enough recent evidence to support the general consensus that "Stated simply, field independent students tend to be, in overall terms, more proficient readers than their field dependent counterparts" (Rasinski, 1984, p. 307).

Blake (1985) studied the relationship between field dependence and sixth grade students' comprehension test scores for both expository and literary texts. Field dependence was measured by the Embedded Figures Test (EFT) and 121 subjects were randomly assigned to the two text conditions. Statistical analysis of the results failed to show statistical difference between the comprehension scores of the field independent and the field dependent subjects.

In a study of the effects of field dependence on reading achievement of high school students, Wilcox et al. (1977) tested the effects of text condensation and field dependence on comprehension of prose material. They hypothesized that field dependent subjects would have more trouble taking the critical elements of a problem out of context and restructuring this material and therefore would do more poorly on an application test than field independent readers. Subjects read a textbook chapter in its original version and in an abridged version. It was found that students who were field independent were moderately more successful in answering the application questions, but the difference was significant only when the application scores

on both immediate and delayed posttests were combined into one score for each of the subjects. Furthermore, there was no significant relationship between field independence and processing of prose when verbal ability was taken into account.

Several researchers have studied the effects of field dependence/independence upon reading achievement of college students. Provost (1981) studied 115 college students to determine possible interactions between teaching strategies and/or modes of evaluation and cognitive style, as measured by the GEFT. Two instructional strategies were used: presentation of materials in a format which allowed passive reading of the text versus presentation of the same material in a format which required the subject to actively engage in various activities involving answering multiple choice items embedded within the text, application of rules to related problems, and summarization of information. Although there was no significant interaction between sex and cognitive style or between treatments and cognitive style, the study did reveal that those subjects who were field independent did score significantly higher on both the free-recall and multiple choice items. Provost concluded that these results indicated "a stable superiority of the field-independent subjects over the field dependent ones" (p. 167).

Smith and Standal (1981) trained groups containing field independent and field dependent subjects (determined

by the GEFT) in two study techniques, mapping and paraphrasing. After a 6 1/2 hour training period spread over ten weeks, the subjects were administered the Descriptive Tests of Language Skills, Form B. Results indicated that there were no interaction effects among training, cognitive style and reading comprehension score. Students who received training in either mapping or paraphrasing did no better than a control group, but the field independent learners scored significantly higher on all subtests than did their field dependent counterparts.

Likewise, field independent college students have been found to perform significantly better overall in comprehending prose under different study strategy conditions (Adejumo, 1983). Three hundred twenty-seven subjects were divided into four groups on the basis of their GEFT scores. On inferential posttest items field-independent control group subjects and those in groups given factual and inferential questions as study aids performed significantly better than the field dependent subjects. Likewise, the field independent subjects in the group given inferential questions as study aids performed better on the factual posttest items. No other differences in the effects of strategies were found between the field independent and field dependent groups. The results of this study support the observation of Witkin et al. (1977) that field independent subjects tend to perform better than those who

are field dependent when the task requires the reader to draw inferences.

The relationship of field dependence to attention and memory has received some attention in attempts to understand the effects of field dependence differences on reading. Robinson and Bennick (1978) assessed the relationship of field dependence/independence to differential efficiency in the use of working memory. They had thirty-two subjects, classified through the Embedded Figures Test (EFT), retain series of digits while modifying phrases to preserve or alter the meanings of those phrases. Field dependence was found to be associated with poorer serial order recall and slower performance when a high memory load was involved. This was interpreted as possibly reflecting field dependent subjects' preference for global modes of processing which results in diminished available processing capacity of the working memory.

On the same topic, Davis and Cochran (1982) reviewed field dependence research dealing with learning and memory and noted that differentiated use of memory processes may be a factor in comprehension differences between field independents and field dependents. Furthermore, they suggested that field dependent readers have trouble attending to subtle yet relevant clues.

Christiansen, Annesley and Scott (1980) studied the effectiveness with which ninth grade field dependent and

field independent readers processed prose at three difficulty levels while reading. They theorized that the outcomes would be influenced by the cognitive styles of the readers as well as by the difficulty levels of the passages. Subjects read cloze passages aloud; then miscues were analyzed and coded according to semantic acceptability. Analysis of patterns of accuracy revealed that the field independent readers had much lower omission rates at all reading levels. These omissions decreased for both groups as the difficulty level of the material decreased, but the decrease was greater for the field dependent readers. Even with the greater decrease, the field dependent subjects had more omissions at the independent level than the field independent subjects had at the frustration level. Finally, the patterns of accuracy of the two groups were most similar at the independent level and least similar at the frustration level. The results suggest that when processing materials at their independent level, both field independent and field dependent readers show a similar pattern of accuracy; but when reading at the frustration level, and to a lesser degree at the instructional level, field independent and field dependent readers display noticeable differences in accuracy. Christiansen et al. suggested therefore that perhaps good readers, no matter what their cognitive style, process print in similar ways; but it is poor readers for whom cognitive style plays a more important

role.

The relationship between field dependence and the ability to resolve text ambiguities has been studied by Lefever and Ehri (1976). They had 69 subjects, classified as field dependent or independent on the basis of the Components Test of the Flanagan Aptitude Classifications Test, find ambiguous sentences and describe the two meanings these sentences could have. Field independence was found to be positively correlated with the number of sentences correctly disambiguated and also with the four types of ambiguities presented. Lefever and Ehri interpreted these findings as evidence that "detection of linguistic ambiguity is not solely a product of linguistic competence but rather also involves nonlinguistic cognitive factors such as the ability to change mental set and to internalize and use rules" (p. 105).

The differences between the ways in which field independent and field dependent subjects use prior knowledge represents one facet of text processing that has been researched by Spiro and Tirre (1980). They hypothesized that subjects who were more stimulus bound in the embedded figures test would tend to be also more text bound when given a reading task providing an opportunity to use a prior knowledge base. One hundred twelve subjects were given the GEFT and then assigned one of two passages which were similar in every respect except for the context in which the

information was presented. Results indicated that when presented with a passage containing eighteen food and beverage items in a supermarket context (schema not highly constrained), both low and high EFT subjects remembered the items equally well. On another passage containing the same eighteen items in a restaurant context (schema highly articulated by order in which courses in restaurant would be ordered) the high EFT subjects scored higher than either the low EFT subjects or the high EFT subjects who had read the supermarket passage which had a less articulated structure. Findings were interpreted as evidence that the low EFT subjects did not display a general inferior ability to recall information but were unable to capitalize on their prior knowledge when given the passage with a highly articulated schema.

In a study with contrasting results, Davey and Kapinus (1985) studied the interrelationship of field dependence and the effects of prior knowledge and order of placement of unfamiliar material in text. Ninety-six eighth grade subjects were grouped according to their scores on a modified form of the GEFT and their prior knowledge of the topic. They then read passages which differed only in whether new information about the topic was placed before or after information with which the subjects were already familiar. They were tested for recall immediately after reading and one week later were given an alternate form of

the recall test. While significant relationships were found between prior knowledge and passage order as well as between testing time and passage order, the field dependence variable accounted for little of the variability (5%) not accounted for by reading ability.

Several studies have explored the relationship between field independence and study strategies. Brooks, Dansereau, and Spurling (1981) compared the differences between field dependent and field independent college students under three text and instructional conditions (text with embedded headings and student instructions and practice in use of embedded headings; text with embedded headings but no instruction; text without headings). They found that when verbal ability was controlled, the relationship between prose recall and field independence was not significant. They suggested that these findings were different from those of Spiro and Tirre (1980) because of the lack of a need for readers to have highly organized prior knowledge in this study.

In a study of the relationship of preferred and nonpreferred study conditions (read only, underlining, or notetaking) to reading test results of field dependent and field independent college students, Annis and Davis (1978) had FI and FD college students study an article under a preferred and nonpreferred study condition (read only, underline, or note taking). They found a tendency for field

independent subjects to score better than field dependent subjects, except when assigned to use both a less effective but personally preferred study technique and no review.

In a related study involving listening rather than reading, Frank (1984) used the Hidden Figures Test to select 104 subjects, of whom half were field independent and half were field dependent. They listened to a lecture under one of four study conditions: one group listened only and were not allowed to take notes; a second group took notes while listening; the third group were given a skeletal outline and took additional notes they thought were important on the outline pages; the fourth group received a complete outline of the lecture and were also allowed to take additional notes on the outline pages. Following the lecture the subjects were all allowed a review period during which those who had notes could study them and those in the group without notes were allowed to think about the lecture and write down points they remembered. Following the review, all subjects were given a 20-item multiple choice test on the lecture. Field independent subjects answered more test items correctly than the field dependent subjects. Under the student's notes conditions the field independent subjects answered significantly more items correctly than did the field dependent subjects. Under the other three conditions there were no differences between the FI and FD groups. Also, field dependent students performed more

poorly under the student's notes condition than under the complete outline condition. Analysis of students' notes indicated that although there was no significant difference between the mean number of information units recorded, the field independent students used fewer words, tended to use an outline form more often, and on the whole took more efficient notes than did the field dependent students.

In another study involving listening, Carrier, Joseph, Krey and LaCroix (1983) instructed both field independent and field dependent sixth grade students in the use of imagery. They then listened to a story and employed the imagery technique. Two other groups were not instructed in using imagery: one of these listened to the story and looked at pictures that accompanied the story, while the other group listened to the story without additional instructions or pictures. Under all three conditions the field independent subjects performed better than the field dependent subjects when given a test of recall. The field dependent subjects differed in that those who had been instructed in the use of imagery performed better than those field dependent subjects in the other two conditions.

This review of studies of the relationship between field independence and reading/learning reveal mixed results but a tendency for field independent subjects to perform either better or at least as well as their field dependent counterparts under a number of experimental conditions.

The Difference Model

Whereas the findings of much research have indicated a relationship between field independence and more success in reading, Brooks et al. (1981) did not find this to be generally true. They attributed their failure to corroborate the prevailing trend to their having controlled for verbal ability in their study and pointed out that "most previous researchers who have reported significant correlations between field independence and prose comprehension scores have not adjusted for verbal ability or other related measures relevant to reading and comprehensional skills" (p. 301). Therefore, in the present study, Cromer's difference model (1970) was used as the basis for differentiating between good and poor readers while at the same time controlling for verbal ability.

Cromer, in his study of decoding and reading comprehension, divided readers with poor comprehension into two subgroups. The first group, called the deficit group, had poor comprehension because of deficient vocabularies and poor word identification skills. The second, the difference group, possessed good vocabularies and adequate decoding skills but nevertheless were weak in comprehension. Cromer found that when presented reading selections in a regular sentence mode, a meaningful phrase mode, a fragmented phrase mode, and a single word mode, the poor comprehenders were

less successful in answering comprehension questions for passages presented in all four modes than were the good readers. Also, the difference readers scores did not differ in any except meaningful phrase mode. In this mode they performed as well as a control group, indicating that they benefited from having the text structured in this way.

Isakson and Miller (1976) studied the hypothesis that poor comprehenders having adequate word recognition skills show a lack of sensitivity to syntactic and semantic cues in text. They studied 24 fourth graders who were good comprehenders and 24 others who had equivalent vocabulary abilities but were poor comprehenders. Subjects read three kinds of sentences aloud: sentences with semantic violations, sentences with semantic and syntactical violations, and normal sentences. Analysis of oral reading errors indicated that the good comprehenders were adversely affected in their reading by semantic violations and even more so by syntactic violations combined with semantic violations. On the other hand, the difference readers were not affected by these violations. These differences were attributed to differences in the use made of language structure.

Levin (1973) studied difference poor fourth grade readers, as defined by their having vocabulary scores at the 4.0 grade level and comprehension scores below grade level, and deficit readers who had vocabulary scores at the 2.5

grade level and comprehension scores below grade level. Subjects were given three types of representations of stories: printed stories to be read, pictorial versions to be interpreted, and printed stories with instructions to use imagery. Two findings were noted. First, neither group of poor readers benefitted more than good readers from the picture versions. Secondly, difference poor readers did benefit significantly from instructions to use visual imagery, while deficit poor readers did not. These results were interpreted as evidence that difference poor readers have good basic reading skills but need organizational strategies.

In summary, it appears that difference poor readers and good readers may use different reading processes that result in differences in comprehension. Further, these differences may in some way be related to cognitive style and may be subject to further study through protocol analysis.

Protocol Analysis

Reading is an active internal process whereby the reader attempts to make use of strategies to understand printed information (Goodman, 1970). Because of the nature of the reading process, it is impossible to directly observe the mental activity involved. Much research in the past has therefore focused on the results of the process, as measured by responses to questions based on what the subject has

read. Such product measurement has been criticized (Glaser, 1981; Simon, 1971) because it does not help us understand the actual thought processes by which the product was derived. In attempting to find methods for drawing inferences about the process rather than measuring outcomes, indirect methods must be used. The study of eye movements has been used extensively for this purpose. Another indirect technique which is receiving increased interest as it is being refined is the study of verbal reports made by subjects. "Generating protocols is actually a composing task. In a study based on the constructive view of comprehension, it seems an entirely appropriate technique" (Lytle, 1982, p. 96).

Although several researchers are credited with introducing the thinking-out-loud method (Ericsson & Simon, 1984), it was the introduction of protocol analysis as a process research method for studying problem-solving strategies (Newell & Simon, 1972) that gave the impetus to the movement to use verbal reports as data. Ericsson and Simon (1980) state:

> One of the most direct and widely used methods to gain information about subjects' internal states is to instruct them to think aloud or talk aloud. . . . With the instructions to verbalize a direct trace is obtained of the heeded

> information, and hence, an indirect one of the internal stages of the cognitive processes." (p. 220)

These verbalizations are recorded and transcribed. The resultant protocols are used as data for both quantitative and qualitative analysis.

Protocol analysis of thinking-out-loud (TOL) data has been the subject of controversy. Nisbett and Wilson (1977) provide arguments against the use of verbal data which rest primarily on their review of studies involving retrospective verbal reports and their conclusion that:

> . . . we do indeed have direct access to a great storehouse of private knowledge. . . . The individual knows a host of personal historical facts; he knows the focus of his attention at any given point of time; he knows what his current sensations are and has what almost all psychologists and philosophers would assert to be 'knowledge' at least quantitatively superior to that of observers concerning his emotions, evaluations and plans. Given that the individual does possess a great deal of accurate knowledge . . . it becomes less surprising that people would persist in

> believing that they have, in addition, direct access to their own cognitive processes. The only mystery is why people are so poor at telling the difference between private facts that can be known with near certainty and mental processes to which there may be no access at all. (p. 255)

Ericsson and Simon (1984) counter with the argument that studies using verbal data do not intend to have subjects report on the actual mental processes but instead attempt to access just that "great storehouse of private knowledge" (Nisbett & Wilson, 1977) which, according to the human information processing model (Newell & Simon, 1972, ch. 14) is held in the short-term memory and is therefore available for verbal reports (Ericsson & Simon, 1984).

Ericsson and Simon (1984) have also challenged the belief that using verbal data is tantamount to also accepting subjects' interpretations of the data or the events reported. They state that "the issue of the reliability of self-reports can (and we think should) be avoided entirely). The report 'X' need not be used to infer that 'X' is true, but only that the subject was able to say 'X'--(i.e., had the information that enabled him to say 'X')" (p. 7).

Olson, Duffy and Mack (1984) have found support for

"the claim that the TOL data are related in an important way to what readers are doing during more ordinary types of reading" (p. 273). In a study done by Olson, Duffy, and Mack (1981) they had subjects think aloud while reading four short stories and four essays. Some subjects were assigned the TOL task and others read normally. The amount of talking done in regard to each sentence read by the TOL group was compared to the time it took the regular readers to read each sentence. Although results were mixed depending on the kinds of material read, findings indicated that places in well-formed stories where subjects did more talking were the same places where the readers under normal conditions also slowed down.

Afflerbach and Johnson (1984) summarize the apparent advantages of verbal reports. These advantages include a validity base which is different from that of most other methods of studying cognitive processes, access to reasoning processes underlying higher level cognitive activity, and analysis of affective elements of reading processes (p. 308). With these potential advantages of the process in mind, research using protocol analysis to study reading processes will be reviewed next.

Studies Using Protocol Analysis

Olshavsky (1976-77) adapted problem-solving protocol analysis to identify the strategies high school students

used to comprehend a short story. She examined the relationship of frequency of use of these strategies to reading interest (as measured by an topical interest inventory), writing style (concrete or abstract), and reading proficiency (measured by the Iowa Silent Reading Test). Subjects verbalized their thoughts at the end of each independent clause. The resultant protocols were analyzed and categorized according to ten strategies: two described problem identification and the other eight involved problem-solving.

Olshavsky found that although good readers and poor readers used the same strategies, good readers used two strategies, "addition of information" and "use of context to define a word" significantly more often than poor readers did. Conversely, poor readers used "stated failure to understand a word" significantly more frequently than the good readers (p. 669). Other results in the expected direction, although not significant, led Olshavsky to conclude that readers use the most strategies when they are proficient readers who are both interested and faced with comprehending abstract material.

Kavale and Schreiner (1979) used protocol analysis to identify reasoning strategies used by average and above-average readers in answering multiple-choice questions. Subjects were 16 sixth grade students chosen on the basis their achievement on the Gates-MacGinite Reading Test and

teachers' choice of the eight most verbal students from both the average and above-average groups, as measured by the standardized test. The thinking-aloud procedure was modelled on audio-tape and subjects were then given two practice items. Following oral reading of both the experimental passages and the instructions for the items, subjects responded to multiple-choice questions having four or five choices. Responses made in reference to the correct answers were analyzed regardless of whether or not the student actually had answered the item correctly.

To analyze the data, Kavale and Schreiner applied the tree diagram classification system developed previously by Jacobson (1973) for identifying reasoning strategies used in a similar task of answering multiple-choice questions. The tree diagram uses a method of classifying responses whereby they are evaluated in a descending delineation. First, each statement is identified as textual or nontextual. Textual responses are then identified as discourse dependent or choice dependent. Finally each response is further subdivided into a third level of categorization (Kavale & Schreiner, p. 109).

Using this system of analysis, Kavale and Schreiner found that both average and above-average readers applied two strategies in a majority of cases: (1) they developed a strategy around the meaning of a word; or (2) they synthesized information by comparison, classification,

definition, or expansion. The two groups differed in that the above-average readers applied these two strategies significantly more often and did so with significantly greater success. Further, they found that the above-average readers demonstrated greater flexibility in using other alternative strategies successfully. Qualitative analysis of subjects' protocols led to the conclusion that the quantitative differences resulted from differences in the use of decoding skills, knowledge of word meanings, and organization of the text into meaningful units.

Waern (1979) developed a model to describe "the changing content of short-term memory during reading" (p. 1) through analysis of subjects' thinking-aloud protocols. She based her model upon the comments made by 21 subjects drawn randomly from a population of 182 first-year psychology students. Subjects were told to read a passage aloud and at the end of each sentence to verbalize every thought they had while reading. The passage was selected to meet three criteria: (1) it should deal with a problem expected to be of interest to the subjects; (2) the subjects should know something about the ideas presented; (3) some ideas likely to be new to the subjects should be presented. To meet these criteria, a sixteen-sentence passage about "creativity" was constructed. Preliminary analysis of the subjects' protocols revealed three main categories of comments: meaning-relevant, stylistic/evaluative, and

affective. Because most of the comments fell into the meaning-relevant category, the model was developed to focus on all comments related to the processing of meaning. The resultant descriptive system took into account three factors. The first consideration was the kind of information the comment referred to: the actual part of the text, previously read text, or the reader's own previous knowledge. The second factor examined was the kind of operation used: reading, evoking own previous knowledge, interpreting, or comparing. The third consideration in the system was the result of the operation linked to the various other operations. Following the development of the descriptive system the researcher established a coding procedure for the judges who coded the protocols.

Christopherson, Schultz and Waern (1981) used protocol analysis to provide empirical evidence as to what thought processes subjects used that might have accounted for the earlier findings of Bransford and Johnson (1972); they had found that subjects who listened to a titled passage on washing clothes remembered significantly more of the content than did subjects who heard the same passage in an untitled condition. Christopher et al. used the same passage on washing clothes used by Bransford and Johnson (1972), but instead of having their subjects listen to it they had them read it either in the titled or untitled condition. Thirty-five high school students were trained to think aloud by

using a warm-up exercise in which they were instructed to verbalize their thoughts while doing a multiplication problem. They then read the passage and commented on their thoughts as they read. After completing the reading they were asked to write as much as they could remember about the passage.

The transcribed protocols were divided into simple sentences and independent clauses and coded according to a classification system that included six main meaning-related categories and three non-meaning related categories. As in Bransford and Johnson's (1972) study, Christopher et al. found that recall was better for those subjects under the titled condition. In addition, they found that subjects who read the untitled passage relied less on world knowledge than did those who read the titled passage. They also made more conscious attempts to represent the meaning of the text by using statements which indicated understanding (or lack of same) or by making interpretations such as paraphrases (p. 575). They concluded that comprehension difficulties may be more related to lack of prior knowledge or failure to relate prior knowledge to what is being read than to deficiencies in reading skills.

In a study designed to identify and compare the reasoning strategies gifted and average readers use to select answers to multiple choice questions following reading of various kinds of discourse, Anderson (1982) used

30 fifth grade students as subjects. Half were identified as "gifted" (based on results of the Cognitive Abilities Test, the Metropolitan Achievement Test, and informal measures) and the other half considered were average readers (based on scores on the Metropolitan Achievement Test). After reading passages from the Gates-MacGinite Reading Test, students answered literal and inferential questions on the passages. They discussed aloud their reasons for accepting or rejecting each choice for each question.

The procedures used to reach answers, regardless of the correctness of the answers, were analyzed and classified according to the tree diagram system developed by Jacobson (1973) and also used by Kavale and Schreiner in 1979 (see previous review of Kavale and Schreiner's study). The number of times each strategy was used successfully to find the correct response was also compared to the total number of times the strategy was used. Anderson found that both gifted and average readers used the same three textual discourse strategies most frequently but that gifted readers were more successful in applying reading strategies.

Lytle (1982) used protocol analysis to examine the comprehension processes of 21 twelfth grade subjects. Using an eclectic approach, she developed a coding system that took into account various current perspectives on the reading process. The theoretical perspectives used by Lytle included schema theory (Adams & Collins, 1979), progressive

refinement theory (Collins, Brown, & Larkin, 1980), reflective thinking (Baron, 1981), human problem-solving theory (Newell & Simon, 1972) and metacognitive theory (Flavell, 1976). The commonality in all of these theories is their view of behavior as a process involving the interaction of the subject and the task. This orientation makes them appropriate theoretical bases for the study of the relationship between the field dependence dimension of cognitive style and the processes readers who differ in their field dependence scores employ in attending to and attempting to comprehend text.

The schema view of reading has as its purpose "to specify the interface between the reader and the text--to specify how the reader's knowledge interacts with and shapes the information on the page and to specify how that knowledge must be organized to support the interaction" (Adams & Collins, 1979, p. 3) and therefore "schema theory provides a way of integrating our understanding of text with our understanding of the world in general" (p. 21) on the assumption that the reader uses previous knowledge as the basis for constructing meaning.

According to the progressive refinement theory of comprehension (Collins, Brown, & Larkin, 1980), readers comprehend text by engaging in a process of developing a "partial model, constructed from schemas triggered by the beginning elements of the text" (p. 387) and then employ a

"refinement process (which) makes use of a variety of general-purpose problem-solving strategies" (p. 387).

In proposing that reflective thinking be a goal of education, Baron (1981) suggested that "some individual differences are a matter of propensities rather than capacities" (p. 291). He lists five phases of the reflective thinking process: "problem recognition, enumeration of possibilities, reasoning (search for, or recognition of, evidence bearing on the possibilities), revision (use of the evidence), and evaluation of the possibilities to decide whether more thinking is required" (p. 295).

The basic tenet of the human problem-solving model (Newell & Simon, 1972) is that the problem-solver (in this case, the reader) sets goals and subgoals and employs various strategies as ways of responding to the "task environment" which consists of the kind of material presented and the specific reading task.

The last of the five bases of Lytle's system for classifying protocols is the theory of metacognition (Flavell, 1976) which focuses on the reader's awareness of his level of understanding and the accompanying use of strategies for regulating understanding (Baker & Brown, 1984).

Lytle's inductively developed system included six major categories (monitoring of doubts, signaling understanding,

analyzing text features, elaborating the text, judging the text, and reasoning) and 21 subcategories. The typology was used to study and classify the verbalizations readers made while reading three transactional texts developed using a contrast pattern.

Because Lytle's study was "exploratory and descriptive" (p. 97), the focus was on the range of reading behaviors exhibited by individual readers. Analysis of the data indicated that "readers exhibit different characteristic styles in comprehending transactional texts; these stylistic differences may be described in terms of three dimensions: (1) patterns of moves, (2) responses to doubt, and (3) author-reader relationship" (p. 260). Further discussion of Lytle's classification system and its adaptation in this study will be included in Chapter 3 of this study.

Analysis of subjects' thinking-aloud protocols was used by Scardamalia and Bereiter (1984) to better understand how students in grades six and eleven respond to comprehension difficulties caused by anomalous information. They used two passages taken from an earlier study of comprehension monitoring behaviors done by Markman (1979). One of these passages contained an implausible statement that was discordant with the readers' knowledge; the other passage contained sentences that of themselves were plausible but when interpreted at the macrolevel contained an incongruous idea. Subjects were trained in the thinking-aloud procedure

by demonstration of types of reading behavior and protocol statements. They then read each passage and thought aloud both during and after the reading. Protocols relating to text interpretation that were considered clear enough to be classified were categorized as either "detail interpretations" or "macro-interpretations."

Findings indicated that both younger and older students exhibited more detail interpretations than macro-interpretations, but the older students made significantly more macro-interpretations than the younger students. Furthermore, recognition of the anomaly in the passage requiring macrolevel interpretation was related to reading strategy but not to school grade. They concluded that immature readers tend to "proceed through text by testing individual items of information against their world knowledge" (p. 387). On the other hand, examination of the younger readers' summaries of the passages led to the conclusion that immature readers do not merely interpret individual details but rather do engage in some synthesizing activities leading to "statements of gist" (p. 387) of the passage. In contrast, the protocols of the more mature readers showed a more sophisticated cycle of macro-proposition construction.

Bereiter and Bird (1985) sought to identify potentially teachable strategies that adult readers use when dealing effectively with comprehension difficulty. They trained ten

adult readers in thinking aloud procedures by first demonstrating and then having the subjects practice expressing aloud their thoughts while reading. They were encouraged to verbalize what they were thinking at whatever time these thoughts came to mind rather than at a cued time. These procedures were then applied to six passages representing six prose types: exposition, description, narration, personal opinion, discussion of controversy, and description of process.

The protocols were transcribed and analyzed with a focus on how subjects respond to "recognition of something unsatisfactory in the meaning being constructed from the text" (p. 136). In this way the researchers identified and described four strategies (with variations) that they considered potentially teachable: restatement of the material in a simpler form; backtracking to a point previously passed; demanding relationships to be established in later parts of the text, and problem formulation as a way of activating problem-solving procedures.

Specific Aspects of Protocol Analysis

Afflerbach and Johnston (1984) have discussed the methodology for using verbal reports in reading research. In doing so, they have described the elements that must be considered when assessing such studies. Variations of the methodology were addressed under four main headings: (1)

tasks and procedures, (2) subjects, (3) analysis of verbal report protocols, and (4) research designs. These four topics will be considered next through a comparison of how the research studies previously discussed addressed each of these issues.

When assessing the tasks and procedures used for collecting verbal data, the kind of training provided will influence the explicitness of the verbalizations and ultimately the degree to which the researcher needs to make inferences regarding the comprehension processes of the subjects. Waern (1979) gave subjects no training but provided preliminary trail passages. Christopherson et al. (1981) had subjects work through multiplication problems aloud to get them comfortable with thinking out loud. Olshavsky (1976-1977) and Lytle (1982) both provided general training and practice sessions.

Afflerbach and Johnson (1984) state that demonstration tapes containing comments and examples that suggest strategies of procedures may bias subjects' reports (p. 309). Nevertheless, four studies reviewed used demonstrations as training. An audio taped model of the procedure was used by Kavale and Schreiner (1979) to train their subjects. Similarly, Anderson (1982) demonstrated the technique through playing a tape for the subjects to listen to. Bereiter and Bird (1985) used ten minute demonstrations by the researcher. Scardamalia and Bereiter (1984) provided

45 minute training sessions including major types of reading behaviors and protocols identified from previous research.

There are two basic types of instructions, general and focused (Olson et al., 1984) that may be provided. Both types have advantages and disadvantages. General instructions encourage subjects to "talk about a wide range of things" (p. 258) and therefore allow unique and varied input, but data obtained is difficult to analyze. Focused instructions, on the other hand, direct subjects "to talk about one type of thing or do one type of activity" (p. 258) and therefore provide more limited data which more readily lends itself to analysis and classification. Waern (1979) and Bereiter and Bird (1985) provided general instructions that the subjects read the text aloud and express any thoughts at the moment they came to mind. Subjects in the study done by Christopherson et al. (1981) were directed to comment on their thoughts while reading. Olshavsky (1976-1977) used general directions which told subjects to talk about what they were doing and thinking as they read. Lytle (1982) also provided subjects with general instructions which had them say what they were thinking after silently reading each sentence in the passage. Subjects in the Scardamalia and Bereiter (1984) study were instructed to read normally and think aloud as they did so; they also were to continue thinking aloud after finishing the reading.

Focused instructions were given by Kavale and Schreiner

(1979) and Anderson (1982). Both of these studies analyzed protocols of subjects' selection of multiple choice answers for questions based on the passages they had read; therefore readers were instructed to discuss aloud their reasons for accepting or rejecting every choice available.

Probes of two kinds are used in protocol analysis research. The researcher can either build probes into the task or can provide a probe whenever the subject becomes silent. The latter technique was suggested by Hayes and Flower (1980) as a way of preventing subjects from forgetting to think aloud when they are engrossed in the material; it was cautioned against by Afflerbach and Johnston (1984, p. 312) because of the possibility of causing bias in the reports.

Olshavsky (1976-1977) provided probes in the form of red dots at the end of each independent clause. Lytle (1982) arranged the passages into individual sentences each separated from those before and after it by blank areas. Subjects were to talk at the end of each sentence. Waern (1979) used verbal and nonverbal signals to prompt subjects to verbalize or to stop talking when no more information was wanted.

"The selection of subjects for verbal reporting tasks requires consideration of the objectives of the research, the task to be performed, and knowledge of the potential problems that may be encountered due to the uniqueness of

the verbal reporting task" (Afflerbach & Johnston, 1984, p. 313). Although subjects for TOL tasks have ranged in age from fifth grade students (Anderson, 1982) to adults (Bereiter & Bird, 1985), most studies have tended to focus on the average and above average reader. Kavale and Schreiner (1979) and Anderson (1982) compared gifted and average readers. Anderson's selection of subjects was based on teachers' ratings of potential subjects' verbal ability as well as results of standardized tests. Lytle (1982) compared a range of readers in the twelfth grade of an independent high school, but the lowest ranking subject had a junior year verbal SAT score of 380, suggesting that none of her subjects were very poor readers.

Some studies do not identify the verbal ability or reading scores of the subjects studied. For example, Bereiter and Bird (1984) simply identified their subjects as 10 adults, two who were graduate students and eight who were employees in middle class occupations. Waern (1979) chose her subjects randomly from a population of first year college psychology students.

The problems inherent in collecting TOL data from less verbal subjects have prevented most researchers from attempting to study the reading processes of this group. The only study reviewed that has attempted to assess the thinking processes of poor readers was done by Olshavsky (1976-1977). According to Afflerbach and Johnston (1984),

"Research is needed using highly verbal poor readers. Although there remain hazards in comparing such children to low verbal poor readers, we would be a step closer to broader generalization" (p. 313).

In analyzing data gathered from verbal reports, special considerations must be made "due to the qualitative, language-based nature of the data, and variability in amount and quantity of cognitive process reporting that may be found within even a single protocol" (Afflerbach & Johnston, 1984, p. 315). It is necessary that the researcher make a theoretically based decision on which data should be the focus of study and how it should be analyzed in accordance with the model and its terminology. "This is often done by first determining coding categories, a priori, and then having human judges make the coding assessment" (Ericsson & Simon, 1984, p. 5). In coding verbalizations and classifying data, some researchers code everything the subject said, while others code only certain information or use only classifications represented by a minimum number of occurrences of the strategy. Each method has advantages and limitations. Elimination of some utterances by the subject and/or requirement of quantitative criteria for a category to be used contribute to ease in analysis but may result in the loss of some potentially important information (Afflerbach & Johnston, 1984, p. 317).

In order to analyze the reading strategies used by

readers in responding to standardized measures of comprehension, a tree diagram originated by Jacobson in 1973 (cited in Kavale and Schreiner, 1979) had been used by Kavale and Schreiner (1979) and by Anderson (1982). This classification system was based on behavioral definitions of reasoning strategies.

Scardamalia and Bereiter (1984) used a dichotomous system whereby subjects' statements judged to be both interpretive and clear enough to be classified were categorized as either "detail interpretations" or "macro-interpretations" (p. 383). Whereas Scardamalia and Bereiter considered only meaning-related statements in their system, Christopherson et al. (1981) established two major categories, meaning-related and non-meaning related, with nine subcategories subsumed under the two major categories.

Four strategies were identified by Bereiter and Bird (1985) in a study whereby they sought to focus specifically on those strategies which they considered could be taught. These included (1) restatement, (2) backtracking, (3) demanding relationships, and (4) problem formulation.

Waern (1979) developed a 5-step coding process for each meaning-relevant comment and in a subsequent study in which she applied this process she utilized the data from comments made in only the five most commonly used categories.

Another study using a coding process comprised of several steps was that done by Olshavsky (1976-1977). She

used three steps for classifying three types of strategies (word related, clause related, and story related) and then further classifying each of these strategies into one of 10 subcategories.

Lytle (1982) used an analytic system, "Types of Moves," which contained six major categories of moves and twenty-one subcategories. Further discussion of Lytle's classification system is included in Chapter Three.

Establishing reliability of the classifications of subjects' protocols must be a consideration of research using this tool. As with other aspects of this type of research, there is a trade-off between the complexity of the classification system and the difficulty in handling the data with accompanying problems in establishing reliability. Olshavsky (1976-1977) reclassified the protocols of six subjects with a resultant average of 88% agreement. Three independent raters reached a minimum of 80% agreement with the researcher on the protocols of one of those subjects.

Kavale and Schreiner (1979) did not test the reliability of their classifications. Instead they relied on the reliability previously established in Jacobson's 1973 study which had used the same classification system and thereby "concluded that the classification scheme was reliable for categorizing subject responses" (p. 111) in their study. Anderson (1982), who also used the same classification system, established reliability by finding

the percentage of agreement between four judges. She used discussion with raters who had made dissenting decisions and thereby established at least 75% agreement on each item (p. 71).

Waern (1979) tested the reliability of her coding system by having two judges independently code ten randomly selected protocols; interrater reliabilities between 86% and 96% were established for the five different coding steps used (p. 14).

Scardamalia and Bereiter (1984) used the averages of two raters' frequency counts and thereby established .81 and .90 correlations between the frequencies of the two raters.

Lytle (1982) established reliability by correlating the number of times two raters identified each of six major categories for each sentence and found the correlation coefficients for these categories to range from .87 to .96.

Observation of the research designs of studies using protocol analysis reveals that by their very nature they vary greatly but do exhibit some areas of similarity. An obvious similarity is that, due to the nature of the tasks and the time necessary to transcribe and analyze protocols, most researchers limit the number of subjects they use. Studies herein reviewed cited number of subjects ranging from 10 (Bereiter & Bird, 1985) to 35 (Christopherson et al., 1981).

Secondly, various indicators of the primary

experimental task have been used by some researchers. Several researchers have used oral recall of the content in addition to the TOL data. Lytle (1982) had her subjects retell the information in the passage and allowed them to look back while doing so. Scardamalia and Bereiter (1984) had their subjects recall the passage orally in as much detail as possible and write summaries from memory. Christopherson et al. (1981) used written recall of content as an additional indicator of comprehension.

In addition to recall activities, some researchers have used methods of assessing accuracy of comprehension in conjunction with the oral data. Lytle (1982) used holistic scoring of subjects' retellings. Kavale and Schreiner (1979) and Anderson (1982) used success of the strategies used by subjects in answering multiple choice questions as further indicators of the primary task.

In summary, protocol analysis is a relatively recent method of reading research which provides a means of drawing inferences about readers' thinking processes. Protocol analysis studies are effective to the extent to which the research is well designed, the subjects are chosen appropriately, the tasks and procedures have minimal influence on subjects' performance, and the verbal reports are analyzed and interpreted with care.

Summary

When we attempt to understand reading comprehension problems, we need to consider factors other than "intelligence" that may account for reading difficulties; perhaps the reader's cognitive style is one contributing factor. The theory of field independent and field dependent cognitive style asserts that learners experience the world, including symbolic information, from some point along an articulated to global continuum.

Cromer (1970) has provided a model for differentiating between readers who have similar verbal ability, as measured by vocabulary knowledge, but who have disparate abilities to comprehend what they read. This model provides another way of looking at individuals in a way other than degrees of intelligence.

In order to understand how a field dependent or field independent cognitive style influences reading, and in order to understand why students of the same verbal ability have differing levels of success in reading, we need to look beyond wrong answers supplied in response to questions and instead focus on underlying processing difficulties. Protocol analysis, the classification of subjects' verbalizations while engaged in a reading task, is a tool that can be used in that difficult task of attempting to access the thinking process.

CHAPTER THREE

METHOD

Setting and Population

The study was conducted at Kutztown State University, one of fourteen state owned universities in Pennsylvania. The University, located in a small rural community in the eastern part of the state, has an enrollment of approximately 7,000 students. The population from which subjects were drawn was the 102 students admitted to Kutztown University for the fall, 1987, semester on the condition that they enroll in and successfully complete the Developmental Summer Program, a six-week preparatory program conducted during the summer of 1987. Included in this group were the following:

Students who had a predicted grade point average of between 1.50 and 1.80 with both SAT scores over 300.

Students who had a predicted grade point average of over 1.80 with one SAT score over 300 and one SAT score under 300.

Predicted grade point averages were based on a regression formula wherein the high school rank, the verbal SAT score, and the math SAT score were weighted.

Geographically the students represented the same areas as the regular student body. About 80% of both the total

student population and the population of the Developmental Summer Program are from Pennsylvania, while most of the others are from surrounding states, primarily New Jersey and New York.

Instruments Used for Selection of Subjects

The Nelson Denny Reading Test, Form C, 1981--This is a group administered diagnostic test which provides four scores: Vocabulary, Comprehension, Total (Vocabulary and Comprehension), and Rate. Four-year college freshman norms were used for scoring the tests.

Split-halves reliability coefficients reported in the examiner manual for Grade 13 are .96 on the Vocabulary score, .83 on the Comprehension score, and .95 on the Total score. Grade 13 standard errors of measurement, derived from the reliability coefficients and the standard deviations, are Vocabulary, 3.10; Comprehension, 4.77, and Total, 5.70. These grade 13 data were derived from a sample of 1942 subjects. Twenty colleges in 15 states participated in the standardization.

The Group Embedded Figures Test (GEFT), 1971--This is a timed group administered paper and pencil test used to measure the field dependence-independence dimension of cognitive style. Scores are based on the number of simple figures that the subject can correctly find and trace in complex figures. The range of raw scores is 0-18. The

manual reports a reliability estimate of .82 which was obtained by correlating the scores on the second and third sections of the tests of 155 college men and 242 college women. (The first part of the test is not scored.)

Selection of Subjects

On the first day of the summer program each student was given written information explaining the study and was asked to sign a consent form. Parents of students under eighteen years of age were also required to give written consent for their sons/daughters to participate. Through this process eighty potential subjects were obtained and the researcher administered the Group Embedded Figures Test (1971) to them in a group setting. The tests were scored by a Kutztown University Department of Developmental Studies counselor who was familiar with the GEFT. Those subjects whose scores fell in the top third of the distribution of the resulting scores were assigned to the field independent group and those whose scores fell in the bottom third of the distribution were classified as the field dependent group.

All of the students who were accepted for the Developmental Summer Program were administered the Nelson Denny Reading Test, Form C. These tests were administered by the researcher and scored by a graduate student who had been trained in the scoring procedure. Students whose scores were at or above grade level 12 in both Vocabulary

and Comprehension were classified as good readers. Those whose Vocabulary scores were at or above grade level 11.7 (this grade level reflects one fewer correct answer than does a grade level 12.0 score) but whose comprehension scores were three or more levels below their vocabulary scores were classified as difference poor readers.

Next, subjects were randomly selected from those groups so that there were a total of sixteen subjects divided into these four subgroups for further study:

4 field independent good readers

4 field dependent good readers

4 field independent difference poor readers

4 field dependence difference poor readers

In order to avoid bias, the researcher did not participate in the process whereby the sixteen subjects were selected and had no knowledge of the subjects' Group Embedded Figures Test scores or their Nelson Denny Reading Test scores until the data had been collected and the preliminary analysis of the protocols had been completed. The random choice of subjects from among those students who had met the defined criteria was done by a Kutztown University Department of Developmental Studies counselor who had scored the GEFT and also had access to students' Nelson Denny Reading Test scores. Table 1 lists the four subgroups of subjects with their SAT scores, NDRT scores, and GEFT scores.

TABLE 1

Subjects of the Study by Subgroup

Subjects	SAT Scores		Nelson Denny Reading Test Scores			GEFT
	Verbal	Math	Vocabulary	Comprehension	Total	Score
Field Independent						
Good Readers						
E	380	390	13.6	14.1	13.7	13
I	340	430	13.3	13.8	13.4	11
J	440	330	14.5	12.2	13.5	15
L	450	360	15.0	12.2	13.9	11
Difference Poor Readers						
D	340	460	13.8	7.0	10.7	16
N	270	380	13.8	10.8	12.7	13
O	300	420	14.7	8.7	12.9	16
P	290	410	11.7	8.7	10.2	16
Field Dependent						
Good Readers						
F	390	280	12.9	14.4	13.6	2
G	350	350	13.5	13.2	13.2	2
H	430	280	13.3	13.2	13.1	5
K	370	330	13.3	12.8	13.0	4
Difference Poor Readers						
A	300	400	11.7	8.1	9.8	5
B	290	380	12.4	7.0	9.5	6
C	280	390	12.0	8.7	10.4	3
M	300	260	11.7	7.5	9.5	0

Selection of Materials

The three experimental passages were carefully selected by the researcher from college level developmental reading texts (McWhorter, 1987; Milan, 1983) in order to provide real reading tasks typical of those required of students enrolled in college developmental reading courses. Further, since field independence is related to successful performance of various reading tasks, each of the selections provided an opportunity to observe whether (and if so, how) field independent and field dependent readers differ in their attention to salient clues, use of prior knowledge and association of ideas with prior knowledge, use of mental imagery, and use of diverse organizational strategies.

Finally, passages were chosen with the intent that they be of sufficient diversity and difficulty to be challenging to all the subjects. Diversity of topics was achieved through selection of a literary passage, a social science passage, and a natural science passage. The difficulty of each passage was determined through examination the ideas presented, the organization and development of the paragraph, and the vocabulary.

Passage #1, "Waugh," (see Appendix A) is a literary passage in which the speaker draws an extended analogy between marriage and an army career. The reader is required to view the passage from the perspective of a thirty-nine

year old man and to draw numerous inferences in order to understand the paragraph. The passage is complicated by the speaker's inserting his thoughts about other topics into his inductively developed analogy. Vocabulary such as proprietary and importunate contribute to the difficulty of the passage.

Passage #2, "Social Institutions," (see Appendix B) is a social science selection which is challenging because in achieving its purpose of differentiating between social institutions and social groups it requires the reader to make careful distinctions between various concepts, definitions, and examples. Words such as entities and abstraction and phrases such as systems of norms contribute to the difficulty of this paragraph.

Passage #3, "The Biosphere," (see Appendix C) is a natural science passage chosen because it begins with instructions for the reader to engage in visualization without stating any purpose for the task. Furthermore, it has a high density of ideas; one eighteen-sentence paragraph includes discussion of the parts of the biosphere, the meanings of biosphere, atmosphere, and geosphere, the distance of the biosphere's upper and lower limits, the role of the biosphere in the life cycle, and the difference between open and closed systems. The major vocabulary difficulties in this passage lie in the scientific words such as biosphere.

Collection of Data

The researcher met individually in a private office with each of the sixteen subjects three times during the six week Developmental Summer Program. During the first meeting subjects were made to feel comfortable and then were introduced to the purpose of the research: to learn more about the processes readers use when they read for understanding. Next they were trained in the thinking-out-loud (TOL) procedure. To standardize the training as much as possible, the instructions were read from a prepared script (see Appendix D) and the researcher solicited and answered any questions the subjects had. To avoid training for specific kinds of responses, no demonstrations of the procedure were presented.

Next, the subjects were given an untitled practice selection in the same format as the experimental selections. The passage was arranged so that each sentence was numbered and typed separately, with several spaces between sentences. Subjects were given a paper mask to slide down the page in order to uncover each new sentence as they were ready to read it. They were told to read the number of the sentence orally, read the sentence itself silently, and then say whatever they were thinking as they read the sentence.

During the second meeting the subjects were given further practice and, when they were comfortable with the

procedure, they were given the first of the three experimental passages. As in the practice selections, they were directed to uncover the passage sentence by sentence, read the number of the sentence aloud, read the sentence silently, and verbalize their thoughts. The second and third experimental passages were completed during the third meeting. Subjects' verbalizations for all practice and experimental passages were audio-taped. Subjects summarized each passage immediately after finishing the TOL procedure and these summaries, done without further reference to the passage, were also audio-taped.

During the fall of 1987 the researcher transcribed all the subjects' verbalizations for the three experimental passages and the summaries produced at the end of these passages. Next, using Lytle's (1982) typology as a tentative framework, the researcher did a preliminary analysis of all the protocols of all the subjects.

In the spring of 1988 the researcher held the fourth individual meeting with each of the subjects except those three who had withdrawn from the University. At this time the purpose of the research was reviewed and the subjects were introduced to Lytle's "Types of Moves (Short Form, Version II)" (Lytle, 1982, p. 257) (see Appendix E). The proportions of moves they had made in each of the major categories, based on the preliminary analysis of the data, were discussed with them. The subjects were encouraged to

discuss the relationship of this analysis to their own perceptions of the way they read.

In order to gain further insight into individual differences in reading styles, one representative subject from each of the four subgroups studied was selected for an individual case study. Prior to the fourth meeting, two field dependent subjects, one good reader and one difference poor reader, and two field independent subjects, again one good reader and one difference poor reader, had been asked to write reading autobiographies using a suggested format that they were given (see Appendix F). During this meeting the researcher discussed with these subjects the autobiographies they had written, other topics from the suggested format, their views of the process used in gathering the data and of the experience itself, and their responses to the information they had received as a result of the preliminary analysis of their protocols. These discussions were also audio-taped and later transcribed.

Classification System Adapted

Preliminary tentative analysis of all subjects' protocols was done by using the system developed by Lytle (1982) as its basis. Lytle's typology was chosen for several reasons. First, in attempting to analyze and understand the relationship of reading processes to cognitive styles it is desirable to approach the task with

as comprehensive a view of reading as possible. Rather than being narrowly based on a single theory of reading, Lytle's system is based on five theoretical frameworks whereby "each orientation functions as a different lens, focusing on the readers' protocols from a different angle, and thus contributing to the perspectives from which they are viewed" (Lytle, p. 33). For a discussion of these theoretical frameworks see Chapter Two.

Although Lytle's typology was chosen partially for its theoretical bases, it was also selected for its appropriateness for the kinds of observations desired. Whereas Anderson (1982) used the classification system developed by Kavale and Schreiner (1979) to study subjects' responses to multiple choice items, the goal of this study was to examine the processes by which subjects read the actual text. Whereas Olshavsky (1976-1977) developed her classification from a data collecting process in which subjects were instructed to pause and think aloud after each independent clause, this study sought to understand how subjects respond to entire sentences through both the focus of their thoughts and the amounts of verbalizations produced.

Lytle's (1982) system for classifying moves consisted of six major categories of moves: "MONITORING OF DOUBTS, SIGNALING, UNDERSTANDING, ANALYZING TEXT FEATURES, ELABORATING THE TEXT, JUDGING THE TEXT, and REASONING" (p.

127). Twenty-one subcategories of moves were subsumed under these six categories (see Appendix E).

According to Lytle:

> The coding system can be used to determine the frequency and patterns of moves within and across subjects. Sequences of moves in an individual protocol can also be taken together, diachronically, to show a reader's use of strategies in particular situations. Thus the moves describe some aspects of in-process reading. They do not evaluate the subject's comprehension nor can they be used to score the subject's oral retellings. (p. 127)

In doing the preliminary analysis of all the protocols of all 16 subjects, the researcher used Lytle's (1982) six categories and 22 subcategories as they matched the data being analyzed. In cases where none of Lytle's designations were appropriate categories for identification of the protocols, new moves were tentatively identified.

After completing this process, the researcher discussed the suggested additional categories of moves with Professor Rubenstein, a member of the researcher's committee, who then applied the revised classification system to three subjects' protocols for the "Biosphere" passage. Next the researcher

and Professor Rubenstein compared their analyses and, based on discussion of outcomes, observations, and problems, further changes in the categories and their descriptions were made. Both applied the revised classification system to three more subjects' protocols for the "Biosphere" passage and the category refinement process was repeated. A third round of application and analysis resulted in agreement that the revised instrument was ready to be subjected to a reliability study.

The revised form of the instrument (see Figure 1) includes Lytle's six original categories and three new ones: (1) Implementing Strategies was added as a totally new category; (2) Lytle's Signaling Understanding was broken into two separate categories, Signaling Knowledge and Demonstrating Understanding; and (3) Lytle's Personal Response, a subcategory of Elaborating the Text, was made a separate new category, Personalized Response. (See Appendix E for the comparison of the classification system of Lytle to the revision done by this researcher.)

In addition to the increase in the number of major categories from Lytle's six to nine, there was an accompanying placement of each of these nine categories within one of five superordinate categories. These categories were chosen to reflect unifying elements identified by comprehension theorists and for their potential usefulness in subsequent analysis of subjects'

I. COMPREHENSION MONITORING
  MONITORING of Doubts
    M1 declares lack/partial understanding of word
    M2 declares lack/partial understanding of 2 or more words, clause, or sentence
    M3 points out conflicts involving text/reader's knowledge
    M4 indicates awareness that word, phrase, sentence or paragraph could have several meanings
  IMPLEMENTING Strategies
    I1 indicates need to reread
    I2 indicates need to read on

II. CONSTRUCTING MEANING
  ELABORATING the text
    E1 uses sensory imagery
    E2 recalls knowledge or experience of lack of same
    E3 notes relationship of idea to earlier idea
  REASONING
    R1 formulates hypothesis
    R2 makes prediction
    R3 questions or searches for evidence
    R4 makes explicit use of evidence; draws conclusion
    R5 revises previous reasoning move

III. KNOWLEDGE AND COMPREHENSION
  SIGNALING Knowledge
    S1 reports understanding or agreement
    S2 restates or paraphrases information
  DEMONSTRATING Comprehension
    D1 summarizes two or more sentences
    D2 goes beyond summarizing to interpretation of meaning

IV. CRITICAL THINKING
  ANALYZING Text Features
    A1 points out or comments on choice, impact, purpose, or omission of word(s)
    A2 points out or comments on choice, impact, purpose, or omission of idea(s)
    A3 points out or comments on syntax or length of sentence
    A4 points out or comments on sentence or paragraph function
    A5 points out or comments on rhetorical or stylistic aspects
  JUDGING the Text
    J1 evaluates ideas
    J2 evaluates text features

V. PERSONALIZED RESPONSE
    P1 expresses like or dislike of content
    P2 responds to task comments on purposes, goals, performance

Figure 1. Adaptation of Lytle's Types of Moves

broader reading patterns.

The Comprehension Monitoring category reflects Flavell's (1976) identification of metacognition as "one's own cognitive processes and products or anything related to them" including "the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objects" (p. 232). In addition, the designation Comprehension Monitoring was especially chosen in accordance with Baker and Brown's (1984) differentiation between the terms metacognition and comprehension monitoring. Baker and Brown consider metacognition as a term applied to knowledge about cognition in general while comprehension monitoring applies mainly to reading comprehension of connected discourse and involves a two part conscious process: recognition by the reader of a failure to understand and subsequent choice of fix-up strategies in an attempt to successfully respond to the problem of not comprehending.

The Construction of Meaning category was chosen in keeping with the schema-theoretic view of comprehension (Adams & Collins, 1979) with its goal being "to specify the interface between the reader and the text--to specify how the reader's knowledge interacts with and shapes the information on the page and to specify how that knowledge must be organized to support the interaction" (p. 3). Spiro

(1980) has viewed the construction of meaning as an interactive process:

> What we already know informs in top-down fashion information from text that is being processed from the bottom up. ('Top down,' may be loosely equated with 'knowledge based,' ('bottom up' with 'text based.') At the most general level, some individuals seem to rely more on the contributions of text to understanding; others stress processes based on what they already know. (pp. 262-263)

Therefore, the Elaborating the Text category, described by Lytle (1982) as having emphasis "on the reader rather than the text" (p. 131) and the Reasoning category, which implies a text-centered focus including "statements or questions indicating that the reader is trying to resolve his doubts and interpret the text by using problem-solving approaches involving the content or ideas" (p. 133) are both included under the Construction of Meaning superordinate category.

In the Taxonomy of Educational Objectives, Bloom (1956) stated it was not method, instruction materials, subject matter or even content that was being classified; instead what was being classified was "the intended behavior of

students--the ways in which individuals are to act, think, or feel as the result of participating in some unit of instruction" (p. 12). He also differentiated between knowledge and comprehension. According to Bloom, knowledge involves recall. "For measurement purposes, the recall situation involves little more than bringing to mind the appropriate material. . . . The knowledge objectives emphasize most the psychological processes of remembering" (p. 201). On the other hand, comprehension "represents the lowest level of understanding" and includes "translation," "interpretation," and "extrapolation" (p. 204). Therefore, Lytle's (1982) Signaling Understanding category has been broken into two major categories to more closely reflect this differentiation between simple recall or rote repetition (called Signaling Knowledge in this study) and the subject's making some type of use of the content which demonstrates a going beyond mere recall (called Demonstration of Understanding). These two categories are subsumed under the superordinate designation Knowledge and Comprehension.

Critical Thinking has been chosen as the superordinate designation for two of Lytle's major categories, Analyzing Text Features and Judging the Text. Both of these categories take into account the reader's response to the text not only in terms of meaning but also as an object which is subject to feature analysis and evaluation

according to various criteria. Singer (1970) used the interchangeable terminology "evaluation (critical thinking)" (pp. 173) to classify the mental processes which involve identification and critical reaction to the author's words, meanings and ideas. The Critical Thinking superordinate category also reflects the classes of analysis and evaluation in the taxonomy of Bloom (1956), although Bloom did not suggest such a relationship.

The Personalized Response category has been added to the adapted version of the classification system in order to accommodate those moves whereby the reader does not focus on the comprehension of the text but instead responds in an emotional way or reveals his view of himself in relationship to the task or his performance of it. This category, like the Affective Model proposed by Matthewson (1985) takes into account four affective processes, "attitude, motivation, affect and physical feelings" (p. 845). In discussing how affective variables influence reading, Matthewson suggests, "One possibility is that attitude and motivation directly influence attention and comprehension" (p. 845).

Similarly, in the realm of reading protocol analysis, Waern (1979) first considered three categories, one of which was the Affective category. This category was subsequently abandoned by Waern.

Characteristic Statements/Questions

For each of the major categories used by Lytle (1982), she provided a corresponding "type of statement or question that the reader is in effect asking himself and answering as he reads" (p. 127). The researcher used or adapted those of Lytle, and she developed new ones as necessitated by the adaptation and expansion of Lytle's classification system. For comparison of Lytle's list of characteristic statements, see Appendix G. The following statements or questions characterize the gist of the statements made by readers, as interpreted using the superordinate and major categories in the revised classification system:

Comprehension Monitoring: I am aware of my problems in understanding.

Monitoring: I don't understand.

Implementing: I will do this in order to clear up my lack of understanding.

Construction of Meaning: I am trying to understand this.

Elaborating: What does this make me think of?

Reasoning: How can I figure this out?

Knowledge and Comprehension: What have I learned?

Signaling: What information is presented?

Demonstrating: How can I integrate these ideas?

Critical Thinking: How do I view this text?

Analyzing: How does the text work?

Judging: How good is this?

Personalized Response: What are my feelings and attitudes?

The following section contains the final adaptation of the classification system originally developed by Lytle (1982, pp. 128-135). For the five superordinate categories and for other categories not included in Lytle's system, the researcher developed definitions. For the categories originally included by Lytle, the definitions are from Lytle's system and include some revision. For comparison of the revised system with Lytle's system of categories and definitions, see Appendix H.

Explanations and Examples of Types of Moves

I. Comprehension Monitoring includes all moves that include statements or questions indicating awareness of problems in understanding and attempts to regulate comprehension.

Monitoring of Doubts (M) includes statements or questions indicating that the reader doubts his understanding.

M1 statement or question indicating reader is aware of own failure to understand, or own partial understanding of, a word or words

Examples:

I don't understand that word.

I don't really know what fretful means.

What is a biosphere?

M2 statement or question indicating reader is aware of own failure to understand, or own partial understanding of, a sentence or discourse level meaning; reader reports problem in understanding other than that associated with a hypothesis

Examples:

I don't understand what they are trying to say.

I can't figure out what happened.

I'm not sure what they mean by closed systems.

M3 statement or question pointing to conflicts within the text or between the text and the reader's knowledge or beliefs; perceiving a contradiction; expressing disagreement

Examples:

This is like totally opposite from number (sentence) 11.

From what I know an entity is a ghost.

It might feel older, but not old.

M4 reader demonstrates awareness that material could have several meanings and that the reader is not sure which meaning is intended

Examples:

I can't tell is he thinking about this or is he actually doing this.

I don't know if it's his wife or someone he knows.

Implementing strategies (I) includes statements indicating that the reader is focusing on specific material in order to understand it.

I1 reader indicates need to reread part of the text

Examples:

I have to reread it (the sentence).

I don't understand it, so I'm going to read it over.

I2 reader indicates need or desire to read on in order to understand something already read

Examples:

I'm going to go on to the next sentence.

Maybe the next sentence will explain it.

II. Constructing Meaning includes all statements or questions that indicate that the reader is using his own background, experience, perceptions or the content and ideas within the text as he attempts to understand the passage.

Elaborating the Text (E) includes statements that indicate the ways the reader is responding to or experiencing the text. The reader's background knowledge and experiences are predominant.

E1 reader uses sensory imagery (visual, auditory)

Examples:

When I hear speaker, I picture somebody standing up in the middle of a room.

I'm trying to picture a part of the earth occupied by things that relate to the thickness of the ink on a stamp.

E2 reader recalls prior knowledge or experience or recognizes that he lacks prior knowledge or experience

Examples:

I'm thinking of the poetry I had to define yesterday on death and dying and getting older.

I learned this in eighth grade.

E3 reader makes reference to ideas stated previously in the text; reader notes connection(s) between earlier idea and current text

Examples:

It (this sentence) refers back to the family being an institution.

Not very much matter will enter our system, which I guess you could say is the biosphere they talked about earlier, that was not there before.

Reasoning (R) includes statements or questions indicating that the reader is trying to resolve his doubts and interpret the text by using problem-solving approaches involving content or ideas.

R1 reader forms hypothesis or working assumption, including hypothesis about the writer's position; requires explicit acknowledgement of doubt or tentativeness; may use the word might or maybe

Examples:

It seems like they're putting a smaller object in fine detail on a larger object so you can really enjoy the simplicity of the small detail.

Maybe they mean that we usually don't have anything from space on the earth, but it's not impossible to have something from space on the earth.

R2 reader makes a prediction about what is to follow, a prediction of the sort one would make from a hypothesis

Examples:

I guess they're going to tie this in with the life force.

They are about to explain why, I assume, in which way.

R3 reader asks self a question in an attempt to construct the meaning (rather than as an indication of nonunderstanding); reader indicates he is searching for evidence in order to form a

hypothesis

Examples:

Who was his last love?

What part of the atmosphere? So where does the other energy come from?

R4 reader indicates explicit (but not necessarily cited) use of evidence to confirm or disconfirm a hypothesis or prediction or to answer own question; reader comes to conclusion after doubt, hypothesis or question; reader makes an inference based on evidence; may use the word must

Examples:

OK; they say the sun gives that extra energy we need.

Now I know it's not a human being. The word its is used.

R5 reader revises one of his own reasoning moves used previously; this may be implicit or explicit

Examples:

When he talks about the water, when he talks about the third portion, I was waiting for it to say about land; but it didn't say anything about the land.

Now I'm reversed (in my thinking).

III. Knowledge and Comprehension includes all statements which indicate and/or demonstrate that the reader knows what the writer is saying and understands what the text means.

Signaling knowledge (S) includes statements in which the reader signals that he knows what the text is saying and can restate or paraphrase this information.

S1 reader states he agrees or understands

Examples:

I understand that.

That makes sense.

S2 reader restates or paraphrases the sentence without evidencing any integration with background knowledge or previous information from the text; paraphrase may be incomplete or wrong

Examples:

It says that overall religion is an institution, but branches of religion are organizations.

Every living thing is made up of chemicals from the geosphere and the atmosphere.

Demonstrating Comprehension (D) includes statements demonstrating that the reader is reorganizing the text's content and synthesizing ideas not directly expressed by the writer.

D1 reader summarizes the meaning of the text by synthesizing several sentence meanings into one paraphrase

Examples:

The geosphere is underneath the biosphere and the atmosphere is on top of it.

He's in a hut thinking about if he's done all his jobs.

D2 reader extrapolates an idea (beyond summarization) that represents interpretation of the ideas presented in the text and may include integration with the reader's background knowledge or with previous information from text; this may or may not be correct

Examples:

He's married to the army.

An institution is a place where you have to follow rules and there are morals set.

IV. Critical Thinking includes all statements that indicate that the reader is viewing the text as an object and is analyzing both the ideas and the way in which the writer has written them.

Analyzing Text Features (A) includes statements in which the reader, viewing the text as an object,

notices, describes, or comments on features of the text, such as:

A1 choice, impact, or function of words(s); not just quoting, pointing or reading with emphases

Examples:

They're using all kinds of things liked sandwiched and gaseous envelope.

The word its is used.

A2 choice, impact, purpose, or omission of ideas

Examples:

They didn't talk about the place of humans in the biosphere.

They didn't explain that in the first three sentences.

A3 syntax or length of sentence

Examples:

This is a complicated sentence.

He says "he learned her."

A4 function of sentence or paragraph in relation to other sentences or paragraphs in the text; may indicate what sentence or paragraph is doing (e.g., explaining, comparing, restating, expanding); reference to text structure

Examples:

They define the two words institution and organization again.

It's giving an example of how they use the word family.

A5 rhetorical aspects such as tone, type of discourse, discourse force, author's style or strategies, use of metaphor, analogy

Examples:

In this passage the author is drawing an analogy between the responsibilities of being married and those of being in the military.

It seemed to start like a pattern of sizing up the earth here.

Judging the Text (J) includes statements indicating the reader is evaluating (as distinct from responding personally to) the text according to various criteria, such as:

J1 appropriateness, effectiveness, difficulty, or importance of the statement or idea

Examples:

What he is trying to say really makes no sense.

That's kind of like a broad thing to say.

J2 appropriateness, effectiveness or difficulty of text features, including all features listed under A (Analyzing text features)

Examples:

They could have cut out a whole bunch of stuff there and just said that earlier . . . instead of prolonging the passage.

It's a confusing sentence.

V. Personalized Response includes all statements through which the reader responds personally to the text or the task through an emotional response or expression of interest, like or dislike, or through comment on his performance.

P1 reader expresses like or dislike of material, either its subject, content or development

Examples:

That is weird!

This is all about science and I hate science.

P2 reader comments on the reading task, his purposes and goals, or his performance as a reader

Examples:

I get the impression here I'm supposed to be learning all about the biosphere from where it's located in the atmosphere and what its part are and the depth and density.

I get these little pictures in my mind and they all kind of run together.

Addition of Decision Cases

During the preparation for the reliability study it was decided that the availability of exemplary sentences could perhaps facilitate the making of decisions on the categorization of protocols. Therefore, one sentence was created which could theoretically elicit the full range of protocols; then an example of each response category was provided. This additional material, called "Decision Cases," was provided for each of the three raters.

Decision Cases:

While examination of the definitions and examples will be sufficient to categorize most protocols, the following extended example of all categories of protocols which could be produced in response to one sentence is provided to differentiate between those categories that might be confused. It is suggested that when such confusion arises the rater consult the categories in question and compare the protocols for these categories.

(Text) When I think of the artworks which epitomize painting, I immediately picture the texture of Renoir, the line of Matisse, and the colors of Raphael.

M1 I don't know what epitomize means.

M2 I have no idea what he is talking about.

M3 I think more of the muted colors of Renoir when I think about his art.

M4 I'm not sure if he thinks these are the three best or are among the best.

I1 I must read that again.

I2 I'm going to have to continue on to see what he means.

E1 I am picturing some of their work.

E2 I have never seen any paintings by Raphael, but I did see Renoirs and Matisses in a book I was reading about famous artists.

E3 Now he is referring back to the ideas of what makes great art that he talked about earlier.

R1 Maybe he's saying that they are considered great artists because of these characteristics of their work.

R2 He's probably going to give examples of their work.

R3 I want to see what he means when he talks about the textures of Renoir's paintings.

R4 (Reader had earlier questioned why an artist is considered great.) They must be judged on the basis of the characteristics he listed.

R5 I thought he was going to just talk generally, but he is being specific.

S1 I understand his examples.

S2 He says that Matisse, Renoir and Raphael are the greatest artists that ever lived.

D1 The point of the passage is that great art possesses certain characteristics, and artists

such as Renoir are considered among the best because their work displays those characteristics.

D2 Much of the work by contemporary artists such as Andy Warhol wouldn't be considered art, according to this.

A1 He uses art terms such as texture and line.

A2 He doesn't mention the importance of composition in great art.

A3 The way he words his examples gives them a possessive sense--"the textures of Renoir."

A4 He is just listing examples of great artists. (or) Some great artists.

A5 He writes in a very personal way so that the reader learns not only about art but also about the writer's preferences.

J1 This is hard to understand because he is assuming we are familiar with the work of those three artists.

J2 His examples are good ones.

P1 I like this because I want to learn to be a better artist and this gives me some ideas.

P2 I guess I should try to learn these examples.

Establishment of Interrater Reliability

The reliability study involved three raters (Professor Rubenstein, Professor Wood, and the researcher) who independently applied the revised classification system to the protocols of five randomly selected subjects for the "Social Institutions" passage.

First the number of discrete moves per sentence and subject identified by each of the raters were correlated by

pairs. These correlations were .7950, .8869, and .7558. (See Table 2.)

Next the number of times each rater used each of the five superordinate categories and each of the nine primary categories in each sentence were counted. Correlations were then computed between the number of times each pair of raters used each category across sentences and subjects. There were significant correlations between the total number of moves in each category identified by the three pairs of raters (.8599, .8632, and .9927). (See Table 3.) These correlations indicated that there was a strong tendency for all three raters to observe specific moves to occur with similar relative frequencies. Therefore, these findings were interpreted as indicators of reliability of the instrument.

Next the number of moves identified in each category in each sentence across subjects were correlated. (See Table 4). These findings were problematic in that while some correlations were as high as 1.0, others were low. Examination of the data revealed some possible explanations for the low correlations: (1) For both the superordinate categories and the primary categories, low correlations tended to occur with moves of lower average incidence and higher correlations tended to occur with moves of higher average incidence. (See Table 5.) In cases where the average number of identified moves equalled over 49, all six

TABLE 2

Number of Identified Moves by Raters

by Subject and Sentence

SENTENCE	1			2			3			4			5			6			7			8			9			10			11			12			13		
RATER*	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
SUBJECT																																							
C	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
D	2	2	2	1	1	1	5	5	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	2	2	2	3	1	1	1
F	2	2	2	1	2	1	1	1	1	2	2	2	3	2	2	1	1	1	3	3	3	1	1	1	2	1	2	2	1	2	2	2	2	2	2	2	2	4	2
J	1	1	1	1	1	1	3	3	3	1	1	3	1	2	1	1	1	1	1	2	3	2	4	2	2	2	1	2	2	2	1	1	1	1	2	1	2	1	2
O	4	3	4	2	2	3	4	4	3	6	6	5	3	2	3	4	2	2	4	4	4	1	1	1	6	5	3	6	7	3	4	4	3	1	1	1	6	5	4

Correlations between raters: 1 and 2 .8869
2 and 3 .7558
1 and 3 .7950

*Rater 1: J. Becker
Rater 2: Professor Rubenstein
Rater 3: Professor Wood

Table 3

Total Number of Moves Identified

by Raters by Category

	Rater		
Category	Becker	Rubenstein	Wood
Comprehension Monitoring	23	20	23
Monitoring	18	15	19
Implementing	5	5	4
Construction	26	23	19
Elaborating	21	20	19
Reasoning	4	3	0
Knowledge and Comprehension	57	48	63
Signaling	49	46	54
Demonstrating	8	2	9
Critical Thinking	16	32	12
Analyzing	14	24	9
Judging	2	8	3
Personal Response	8	5	1

Superordinate Category Correlations Between Raters:	Becker and Rubenstein	.8599
	Rubenstein and Wood	.8632
	Becker and Wood	.9927

Table 4

Interrater Correlations for Number of Moves Identified by Category and Sentence Across Subjects

Categories	Correlation Coefficients		
	Raters 1 & 2*	Raters 1 & 3*	Raters 2 & 3*
Comprehension Monitoring	.88	.68	.68
Monitoring	.82	.56	.50
Implementing	1.00	.89	.89
Construction	.55	.52	.07
Elaborating	.45	.53	.07
Reasoning	.25	**	**
Knowledge & Comprehension	.73	.74	.60
Signaling	.81	.73	.65
Demonstrating	.42	.13	-.07
Critical Thinking	.61	.64	.47
Analyzing	.50	.66	.41
Judging	.49	.39	.30
Personal Response	.42	.31	-.04

*Rater 1: J. Becker
Rater 2: Professor Rubenstein
Rater 3: Professor Wood

**Rater 3 found zero occurrences of this move.

Table 5

Average Number of Moves Identified Compared to Inter-rater Correlations

	Average Number of Moves Identified	Range of Correlations	Number of Correlations				
			.80+	.70-.79	.60-69	.50-59	<.50
Superordinate Categories							
Knowledge and Comprehension	56	.603 to .740		2	1		
Construction	22.7	.068 to .551				2	1
Comprehension Monitoring	22	.684 to .882	1		2		
Critical Thinking	20	.474 to .643			2		1
Personal Response	4.7	-.036 to .420					3
Major Categories							
Signaling	49.7	.647 to .811	1	1	1		
Elaborating	20	.066 to .533				1	2
Monitoring	17.3	.497 to .821	1			2	
Analyzing	15.7	.406 to .657			1	1	1
Demonstrating	6.3	-.071 to .420					3
Implementing	4.7	.887 to 1.000	3				
Judging	4.3	.300 to .489					3
Reasoning*	2.7	0.000 to .249					1

*There was only 1 correlation in this category since Rater 3 found no occurrences of this move.

of the correlations for these categories (100%) were over .60. In the categories for which the average number of identified moves equalled 15 to 23, seven of the eighteen resulting correlations (39%) were over .60, and thirteen of the eighteen correlations (72%) were .50 or higher. In the categories for which the average number of identified moves equalled fewer than 7, only three of the thirteen correlations (23%) were over .60. This was interpreted as an indicator that low frequency of identified moves, rather than an inherent unreliability of the instrument, at least partially explained the low correlations.

Another consideration which may partially account for some relatively low correlations is the knowledge that "the correlation coefficient is affected by the range of talent (variability) characterizing the measurements of the variables. In general, the smaller the range . . . in X and/or Y the lower the correlation coefficient, other things being equal" (Minium, p. 155). In this study the range (number of times each category was scored for each sentence) was 0-4, with frequent occurrences of 0's (662 in superordinate categories and 1310 in major categories) and few occurrences of 4's (1 in superordinate categories and 0 in the major categories) or 3's (9 in the superordinate categories and 6 in the major categories).

The need to infer reading processes has been addressed by Afflerbach and Johnson (1984). They acknowledge that

certain processes are easier to infer than others and therefore acknowledge that "interrater reliability may be high for explicitly stated or easily inferred processes, while being low for processes that require much inferencing" (p. 317).

Finally, some of the problems in establishing reliability appear to relate to the unique characteristics of the population being studied and of the subjects chosen for the reliability study. The subjects were from a population of students who had not received regular admission to a state university because of relatively poor academic profiles which reflected grade point averages based on high school class rank and/or SAT scores. The subjects studied by Lytle (1982), whose typology formed the basis for the current study, were high school students who had verbal SAT scores ranging from 380 to 780; those subjects with verbal SAT scores of 640 to 780 were designated as "high SAT verbal readers" (p. 241) and those with verbal SAT scores of 380 to 470 were designated as "low SAT readers" (p. 243). In contrast, the subjects of this study had verbal SAT scores ranging from 270 to 450 and all would have been considered low SAT verbal readers by Lytle. Furthermore, three of the five subjects chosen randomly for the reliability study were from the difference poor reader group. In short, there was a vast difference in verbal skill levels of the subjects of the two studies.

Poor readers' protocols may indeed be more difficult to analyze than those of good readers simply because of their frequent failure to engage in purposeful strategies involved in reading comprehension. For example, reasoning is inherent in the human problem-solving model (Newell & Simon, 1972), the reflective thinking model (Baron, 1981), and the progressive-refinement theory (Bruce & Rubin, 1981; Collins, Brown, & Larkin, 1975). Accordingly, in Lytle's 1982 study the move most frequently identified was Reasoning, with the mean number of Reasoning moves identified by two raters being 1.256 and 1.189 occurrences per sentence (p. 120). In contrast, in the present study Reasoning was the move least frequently identified by all three raters, who respectively reported a mean of .06, .05, and 0.0 reasoning moves per sentence.

In contrast, Signaling understanding moves were most frequently identified by all three raters (see Table 2). These moves, which constitute indications of understanding or agreement or include restatements or paraphrases of content, may reflect mechanical responses which are the antithesis of interactive models of reading.

Inconsistencies in the correlational statistics led the researcher to tabulate percentage of agreement scores, measurements of reliability which have been used in other studies involving protocol analysis (See Anderson, pp. 71, 125; Waern p. 14). The number of times any two raters

agreed on the use of each category across all thirteen sentences of the Social Institutions passage was tabulated by subject and expressed as the percentage of agreement of any two raters. (See Table 6). Next the number of times all three raters agreed on the use of each category across all thirteen sentences was tabulated by subject and expressed as the percentage of agreement of the three raters. (See Table 7).

Both of these measurements yielded results that were considered indicative of inter-judge agreement adequate for proceeding to the next step of the study, negotiated scoring. The negotiated scoring was done by Professor Rubenstein and the researcher. All disagreements in the identification of a discrete move and/or the assignment of a designation to a move were discussed.

Informal analysis of the nature of the disagreements provided some additional information on the kinds of problems leading to initial disagreement. First, any disagreement on the segmentation of the verbal data into units for protocol analysis affects the subsequent assignment of categories to the segments and therefore has negative effects on reliability of the designations. Some of the problems involved segmentation. Negotiation led to the resolution of all but one of these disagreements.

The classification of moves was the second problem to be resolved. Most of the classification disagreements were

Table 6

2-way Rater Agreement Across Sentences for 5 Subjects

(Percentages of Agreement on Each Category For All Sentences)

Category	Subject				
	C	D	F	J	O
Comprehension Monitoring	100	100	100	100	100
Monitoring	100	100	100	100	100
Implementing	100	100	100	100	100
Construction	100	100	100	100	100
Elaborating	100	100	100	100	92
Reasoning	100	100	100	100	100
Knowledge & Comprehension	100	100	92	100	85
Signaling	100	100	100	100	100
Demonstrating	100	100	100	100	100
Critical Thinking	100	100	100	100	100
Analyzing	100	100	100	100	100
Judging	100	100	100	100	100
Personal Response	100	100	100	100	100

Table 7

3-way Rater Agreement Across Sentences for 5 Subjects

(Percentages of Agreement on Each Category For All Sentences)

Category	Subject				
	C	D	F	J	O
Comprehension Monitoring	100	85	92	85	54
Monitoring	100	85	92	85	54
Implementing	100	100	100	100	92
Construction	77	85	46	54	38
Elaborating	77	77	62	46	38
Reasoning	100	92	100	85	77
Knowledge & Comprehension	85	85	38	46	08
Signaling	85	92	38	77	31
Demonstrating	100	77	85	70	62
Critical Thinking	77	85	31	85	85
Analyzing	62	85	23	100	85
Judging	100	85	85	85	92
Personal Response	100	92	70	100	62

found to be the result of differences in interpretation of the typology rather than disagreements on the nature of the content of the protocol; and they tended to be centered around certain specific categories, such as Signaling and Demonstrating. Some of the disagreements were resolved by discussion of the definitions of the classifications and others were resolved by assigning dual classifications to the moves. Other disagreements involved the categorization of statements which both raters had had difficulty in classifying independently. These statements often involved a subject's misunderstanding of an early portion of the text. The resultant ongoing confusion then led the subject to make statements that required the raters to make interpretations that went beyond the data presented.

Prior to negotiated scoring, the number of discrete moves segmented and classified by Dr. Rubenstein and the researcher were 128 and 125 respectively (or an average of 126.5). As a result of the negotiated scoring, agreement was reached on 96% of the moves. Therefore, it was determined that reliability had been sufficiently established to proceed with the study.

CHAPTER FOUR

RESULTS

This chapter is divided into three parts that present the results of the study first for the population and groups, then for the subgroups, and finally for the individual subjects. Part I provides (1) results of the analysis of the relationship between field dependence and reading for the entire population of freshmen in the Kutztown University Developmental Summer Program of 1987; and (2) quantitative findings regarding the reading processes of good versus difference poor readers and field independent versus field dependent readers. Part II includes descriptive comparisons of the four subgroups studied: (1) field independent good readers; (2) field independent difference poor readers; (3) field dependent good readers; and (4) field dependent difference poor readers. Part III contains descriptive findings on the comprehension styles of the individual subjects and also includes four case studies, representing one subject from each of the four subgroups. The specific questions of the study are included with each part of the chapter to which they are relevant.

Part I: Questions Relating to the Population and Groups

Question 1: What is the relationship between college freshman developmental students' scores on the Group Embedded Figures Test and a standardized test of reading proficiency (the Nelson Denny Reading Test) by which readers can be classified as good readers or difference poor readers?

The GEFT scores of all 80 students who agreed to participate in the study were correlated with their Nelson Denny Reading Test vocabulary scores and comprehension scores. Students' GEFT scores and NDRT scores are listed in Appendix I. For the GEFT score and NDRT Vocabulary score $r = .277$; for the GEFT score and NDRT Comprehension score $r = .151$. This was interpreted as evidence that there is little relationship between cognitive style, as measured by the GEFT, and overall reading proficiency, as measured by the Nelson Denny Reading Test.

Question 2: Are there differences in the frequency of the various moves readers make while processing text that are related to being field independent versus field dependent?

The number of moves made by each subject in each category across the three passages was totalled. Next the number of moves that were made by the field independent subjects as a group was tabulated by category. The same was

done for the field dependent group. Finally the total number of moves made by each of the two groups was computed. Table 8 compares the total number of moves made by each subject in each superordinate and major category as well as the total number of moves made by each group.

The total number of moves made by the field independent group was 794; the field dependent group made 574. Means and standard deviations for the two groups are given in Table 9. To test for the significance of the difference, a small sample test of the difference between two independent means was used. Results indicated that the difference was not significant ($t = 1.714$; t crit $= 2.977$).

The large standard deviations for the total number of moves confirmed the possibility that one or more subjects' moves may have accounted for a disproportionate number of moves; therefore, the data for the number of moves of the different types was not analyzed statistically. Instead, the proportions of the total number of moves made by each group were tabulated and are shown in Table 10. There were no instances where the field dependent group accounted for at least 60% of the moves in a category, but in those cases where the field independent group produced at least 60% of the total moves, further analysis was done in conjunction with the information on Table 8.

The field independent readers as a group made 65% of the Comprehension Monitoring moves, but much of the

Table 8

Total Number of Moves Made by Field Independent and Field Dependent Readers

	Field Independent									Field Dependent								
Subject	D	E	I	J	L	N	O	P	Total	A	B	C	F	G	H	K	M	Total
Comprehension Monitoring	**21**	**8**	**6**	**7**	**51**	**6**	**26**	**17**	**142**	**5**	**15**	**5**	**10**	**14**	**11**	**9**	**6**	**75**
Monitoring	18	5	5	5	38	6	21	12	110	5	15	3	9	14	10	9	5	70
Implementing	3	3	1	2	13	0	5	5	32	0	0	2	1	0	1	0	1	5
Construction	**9**	**5**	**8**	**9**	**31**	**24**	**52**	**43**	**181**	**8**	**13**	**10**	**23**	**14**	**20**	**14**	**3**	**105**
Elaborating	3	2	4	6	11	2	41	42	111	2	2	6	11	0	6	2	1	30
Reasoning	6	3	4	3	20	22	11	1	70	6	11	4	12	14	14	12	2	75
Knowledge and Comprehension	**22**	**30**	**53**	**58**	**53**	**58**	**36**	**17**	**327**	**53**	**31**	**24**	**25**	**23**	**30**	**40**	**42**	**268**
Signaling	20	23	37	48	47	31	28	12	246	42	28	22	22	13	8	33	37	205
Demonstrating	2	7	16	10	6	27	8	5	81	11	3	2	3	10	22	7	5	63
Critical Thinking	**11**	**14**	**4**	**3**	**42**	**7**	**12**	**7**	**100**	**6**	**17**	**22**	**26**	**3**	**8**	**6**	**5**	**93**
Analyzing	7	14	3	1	27	7	9	6	74	6	17	21	25	2	8	5	5	89
Judging	4	0	1	2	15	0	3	1	26	0	0	1	6	7	0	1	0	4
Personal Response	**3**	**0**	**2**	**0**	**9**	**1**	**18**	**11**	**44**	**0**	**3**	**1**	**6**	**7**	**5**	**8**	**3**	**33**
									Total 794									Total 574

Table 9

Means and Standard Deviations for Field Independent and Field Dependent Subjects' Total Number of Moves

Field Independent Readers	
M	99.25
SD	44.13
Field Dependent Readers	
M	71.75
SD	10.63

Table 10

Proportions of Moves Made in Each Superordinate Category and Major Category by Field Independent and Field Dependent Groups

	Total FI & FD	Total FI	Proportion FI	Total FD	Proportion FD
Comprehension Monitoring	**217**	**142**	**65**	**75**	**35**
Monitoring	180	110	61	70	39
Implementing	37	32	86	5	14
Construction	**286**	**181**	**63**	**105**	**37**
Elaborating	141	111	78	30	21
Reasoning	145	70	48	75	52
Knowledge and Comprehension	**595**	**327**	**55**	**268**	**45**
Signaling	451	246	55	205	45
Demonstrating	144	81	56	63	44
Critical Thinking	**193**	**100**	**52**	**93**	**48**
Analyzing	163	74	45	89	55
Judging	30	26	87	4	13
Personal Response	**77**	**44**	**57**	**33**	**43**

difference was accounted for by the moves of Subject L, who made over one-third of the Comprehension Monitoring moves made by the field independent group. Subjects D, O and P also made more Comprehension Monitoring moves than did any field dependent subject. Likewise, in the Monitoring and Implementing categories, Subject L contributed a large number of the moves made by his group.

In the Construction category, 4 of the 8 field independent subjects each made relatively high numbers of moves which contributed to that group's making 63% of the total moves made. Subjects L, N, O and P all made more Construction moves than did any field dependent subject; while Subjects D, E, I, and J contributed relatively few of these moves. Subjects O and P made most of the Elaborating moves and therefore contributed greatly to the field independent subjects group's making of 78% of these moves.

For the Knowledge and Comprehension category, the number of moves was somewhat evenly distributed among the subjects who were field independent and those who were field dependent. There was substantial variability in the numbers of moves made in the Signaling and Demonstrating categories by individual subjects in both groups, but the groups themselves were similar in their use of these moves.

The only Critical Thinking category in which at least 60% of those moves made were accounted for by one group was Judging; the field independent group made 87% of those

moves. Examination of individual subjects' moves reveals that Subject L accounted for over half of the Judging moves made by the field independent group, while Subjects J, D, and O, also all field dependent subjects, were the only other subjects in either group to make more than one move in this category.

There was little difference in the total number of Personal Response moves made by the two groups, but the individuals did vary, especially in the field dependent group, where Subject I accounted for almost half of the Personal Response moves made by the group.

In summary, it appears that field independent readers tend to make more moves of some types than do field dependent readers. Moves in Comprehension Monitoring, including both Monitoring and Implementing, in Construction, including both Elaborating and Reasoning, and in Judging tended to be made in larger proportion by the field independent subjects. Despite the apparent differences between groups, some of the real differences are accounted for by extreme differences among individual subjects rather than consistent differences between subjects in the two groups. This was evidenced in the Monitoring and Implementing categories as well as in Critical Thinking.

Question 3: Are there differences in the frequency of the various moves readers make while processing text that are related to being a good versus difference poor reader?

The number of moves made by each subject in each category across the three passages was totalled. Then the number of moves that were made by the good readers as a group was tabulated by category. The same was done for the difference poor readers. Finally the total number of moves made by each of the two groups was computed. Table 11 compares the total number of moves made by each subject in each superordinate and major category as well as the total number of moves made by each group.

The total number of moves made by the good readers was 695; the difference poor readers made 673. Means and standard deviations for the two groups are given in Table 12. To test for the significance of the difference, a small sample test of the difference between two independent means was used. Results indicated that the difference was not significant ($t = .156$; $t\ crit = 2.977$).

The large standard deviations for the total number of moves indicated that one or more subjects' moves may have accounted for a disproportionate number of the moves of a group; therefore, the data for the number of moves of the different types was not analyzed statistically. Instead, the proportions of the total number of moves made by each group were tabulated and are shown in Table 13. Few apparent differences emerged, but in those two instances where either group accounted for at least 60% of the total moves produced, further analysis was done in conjunction

Table 11

Total Number of Moves Made by Good and Difference Poor Readers

	Good Readers									Difference Poor Readers								
Subject	E	F	G	H	I	J	K	L	Total	A	B	C	D	M	N	O	P	Total
Comprehension Monitoring	**8**	**10**	**14**	**11**	**6**	**7**	**9**	**51**	**116**	**5**	**15**	**5**	**21**	**6**	**6**	**26**	**17**	**101**
Monitoring	5	9	14	10	5	5	9	38	95	5	15	3	18	5	6	21	12	85
Implementing	3	1	0	1	1	2	0	13	21	0	0	2	3	1	0	5	5	16
Construction	**5**	**23**	**14**	**20**	**8**	**9**	**14**	**31**	**124**	**8**	**13**	**10**	**9**	**3**	**24**	**52**	**43**	**162**
Elaborating	2	11	0	6	4	6	2	11	42	2	2	6	3	1	2	41	42	99
Reasoning	3	12	14	14	4	3	12	20	82	6	11	4	6	2	22	11	1	63
Knowledge and Comprehension	**30**	**25**	**23**	**30**	**53**	**58**	**40**	**53**	**312**	**53**	**31**	**24**	**22**	**42**	**58**	**36**	**17**	**283**
Signaling	23	22	13	8	37	48	33	47	231	42	28	22	20	37	31	28	12	220
Demonstrating	7	3	10	22	16	10	7	6	81	11	3	2	2	5	27	8	5	63
Critical Thinking	**14**	**26**	**3**	**8**	**4**	**3**	**6**	**42**	**106**	**6**	**17**	**22**	**11**	**5**	**7**	**12**	**7**	**87**
Analyzing	14	25	2	8	3	1	5	27	85	6	17	21	7	5	7	9	6	78
Judging	0	1	1	0	1	2	1	15	21	0	0	1	4	0	0	3	1	9
Personal Response	**0**	**6**	**7**	**5**	**2**	**0**	**8**	**9**	**37**	**0**	**3**	**1**	**3**	**3**	**1**	**18**	**11**	**40**
									Total 695									Total 673

Table 12

Means and Standard Deviations for Good and Difference Poor Readers' Total Moves

Good Readers	
M	86.88
SD	41.32
Difference Poor Readers	
M	84.13
SD	27.95

Table 13

Proportions of Moves Made in Each Superordinate Category and Major Category by Good Reader and Difference Poor Reader Groups

	Total G & DP	Total G	Proportion G	Total DP	Proportion DP
Comprehension Monitoring	**217**	**116**	**53**	**101**	**47**
Monitoring	180	95	53	85	47
Implementing	37	21	57	16	43
Construction	**286**	**124**	**43**	**162**	**57**
Elaborating	141	42	30	99	70
Reasoning	145	82	57	63	43
Knowledge and Comprehension	**595**	**312**	**52**	**283**	**48**
Signaling	451	231	51	220	49
Demonstrating	144	81	56	63	44
Critical Thinking	**193**	**106**	**55**	**87**	**45**
Analyzing	163	85	52	78	48
Judging	30	21	70	9	30
Personal Response	**77**	**37**	**48**	**40**	**52**

with Table 11.

In the Construction category, the difference poor readers accounted for 70% of the Elaborating moves, but Subjects O and P made 83 of the 99 Elaborating moves made by the entire group.

Although the good readers made 70% of the Judging moves, Subject L made almost three-quarters of all the Judging moves made by the difference poor readers.

In summary, it appears that good readers do not differ as a group from difference poor readers in the number of moves they make, but there is a wide difference in the number of moves made by individuals within each of the groups.

Question 4: Do readers with similar cognitive styles but different reading proficiencies exhibit consistent patterns of moves when reading different materials?

Table 14 shows the correlations of the proportions of moves in the same category between passages for the eight field independent subjects. Six of these 15 correlations were significant. These included one Comprehension Monitoring correlation, "Waugh" and "Social Institutions," $p < .005$ ($r = .85$). Two of the 3 Construction correlations were significant: "Waugh" and "Social Institutions," $p < .05$ ($r = .65$); and "Biosphere" and "Waugh," $p < .005$ ($r = .88$). All of the Knowledge and Comprehension correlations were significant: "Waugh" and "Social Institutions," $p <$

Table 14

Between Passage Correlations of Proportions of Moves in Same Category for Field Independent Readers

	SI CM	SI Const	SI K&C	SI CT	SI PR
W CM	[d].849				
W Const		[a].652			
W K&C			[a].628		
W CT				-.152	
W PR					.214
B CM	.309				
B Const		.605			
B K&C			[a].662		
B CT				.438	
B PR					.467

	W CM	W Const	W K&C	WCT	WPR
B CM	.010				
B Const		[d].884			
B K&C			[d].899		
B CT				.253	
B PR					.442

a = $p < .05$
b = $p < .025$
c = $p < .01$
d = $p < .005$

W = Waugh
SI = Social Institutions
B = Biosphere
CM = Comprehension Monitoring
Const = Construction
K&C = Knowledge and Comprehension
CT = Critical Thinking
PR = Personal Response

.05 (r = .63); "Biosphere" and "Social Institutions," $p < .05$ (r = .66); and "Biosphere" and "Waugh," $p < .005$ (r = .90). In addition, 8 of the other 9 correlations were in the expected direction.

Table 15 shows the correlations of the proportions of moves in the same category between passages for the eight field dependent subjects. Two of these correlations were significant. For the Knowledge and Comprehension category, the "Biosphere" and "Waugh" correlation was significant, $p < .05$ (r = .67). Likewise, for the Critical Thinking category a significant relationship was found between the "Biosphere" and "Waugh" passages $p < .005$ (r = .84). Eight of the remaining correlations were in the expected direction.

Based on a comparison of these data for the field independent and field dependent subjects in this study, it appears that there may be a tendency for the field dependent subjects to be somewhat more flexible than the field independent subjects in the use of moves across passages.

Question 5: Do readers with similar proficiencies but different cognitive styles exhibit consistent patterns of moves when reading different materials?

Table 16 shows the correlations of the proportions of moves in the same superordinate category between passages for the eight good readers. Two of these correlations were significant: Comprehension Monitoring on the "Biosphere" and "Social Institutions" passages, $p < .01$ (r = .82); and

Table 15

Between Passage Correlations of Proportions of Moves in Same Category for Field Dependent Readers

	SI CM	SI Const	SI K&C	SI CT	SI PR
W CM	-.552				
W Const		.172			
W K&C			.499		
W CT				.553	
W PR					-.069
B CM	.475				
B Const		-.005			
B K&C			.355		
B CT				.575	
B PR					.118

	W CM	W Const	W K&C	WCT	WPR
B CM	-.390				
B Const		.320			
B K&C			[a].674		
B CT				[d].839	
B PR					-.279

a = p < .05
b = p < .025
c = p < .01
d = p < .005

W = Waugh
SI = Social Institutions
B = Biosphere
CM = Comprehension Monitoring
Const = Construction
K&C = Knowledge and Comprehension
CT = Critical Thinking
PR = Personal Response

Table 16

Between Passage Correlations of Proportions of Moves in Same Category for Good Readers

	SI CM	SI Const	SI K&C	SI CT	SI PR
W CM	-.117				
W Const		-.370			
W K&C			.286		
W CT				-.023	
W PR					.194
B CM	[c].816				
B Const		-.408			
B K&C			.279		
B CT				[a].687	
B PR					.084

	W CM	W Const	W K&C	WCT	WPR
B CM	-.184				
B Const		.397			
B K&C			.286		
B CT				.552	
B PR					-.285

a = p < .05
b = p < .025
c = p < .01
d = p < .005

W = Waugh
SI = Social Institutions
B = Biosphere
CM = Comprehension Monitoring
Const = Construction
K&C = Knowledge and Comprehension
CT = Critical Thinking
PR = Personal Response

Critical Thinking on the "Biosphere" and "Social Institutions" passages, $p < .05$ ($r = .69$). Seven of the other 13 correlations were in the expected direction.

Table 17 shows the correlations of the proportions of moves in the same superordinate category between passages for the eight difference poor readers. Nine of these 15 correlations were significant. These included one Comprehension Monitoring correlation, "Waugh" and "Social Institutions," $p < .005$ ($r = .91$). All three construction correlations were significant: "Waugh" and "Social Institutions," $p < .005$ ($r = .83$); "Biosphere" and "Social Institutions," $p < .025$ ($r = .71$); and "Biosphere" and "Waugh," $p < .005$ ($r = .84$). Likewise, all three Knowledge and Comprehension correlations were significant: "Waugh" and "Social Institutions," $p < .01$ ($r = .84$); "Biosphere" and "Social Institutions," $p < .025$ ($r = .76$); and "Biosphere" and "Waugh," $p < .025$ ($r = .79$). For the Critical Thinking category, 2 of the 3 correlations were significant: "Waugh" and "Social Institutions," $p < .05$ ($r = .68$; and "Biosphere" and "Waugh," $p < .025$ ($r = .75$). Of the six correlations that were not significant, five were in the expected direction.

From the comparison of these data for the good and difference poor readers it appears that the good readers in this study may be more flexible in use of strategies than the difference poor readers.

Table 17

Between Passage Correlations of Proportions of Moves in Same Category for Difference Poor Readers

	SI CM	SI Const	SI K&C	SI CT	SI PR
W CM	[d].910				
W Const		[d].834			
W K&C			[c].832		
W CT				[a].689	
W PR					.172
B CM	-.186				
B Const		[b].708			
B K&C			[b].760		
B CT				.311	
B PR					.550

	W CM	W Const	W K&C	WCT	WPR
B CM	.305				
B Const		[d].839			
B K&C			[b].788		
B CT				[b].753	
B PR					.440

a = $p < .05$
b = $p < .025$
c = $p < .01$
d = $p < .005$

W = Waugh
SI = Social Institutions
B = Biosphere
CM = Comprehension Monitoring
Const = Construction
K&C = Knowledge and Comprehension
CT = Critical Thinking
PR = Personal Response

Part II: Questions Relating to the Subgroups

Question 1: How do field independent good readers compare to field independent difference poor readers in the processes they use when reading?

Figure 2 shows the relative use of moves in the superordinate categories of the classification system for both field independent subgroups. The field independent good readers used a total of 393 moves, or an average of 98.25 per subject, while the difference poor readers used 401 moves, or an average of 100.25 each. In the superordinate categories, both subgroups used Knowledge and Construction moves more frequently than any other, but the good readers used them 49% of the time, whereas the difference poor readers used these moves only 33% of the time.

The superordinate category used second most frequently by the good readers was Comprehension Monitoring, which they used in 18% of their moves, while the Construction category was used second most frequently by the difference poor readers, who used it 32% of the time.

In contrast, the good readers relied on Construction moves only 13% of the time, using them less often than Critical Thinking moves which they employed 16% of the time. The difference poor field independent readers engaged in Critical Thinking for 9% of their moves. Both subgroups

Field Independent Good Readers			Field Independent Difference Poor Readers		
Superordinate Category	Raw Number of Moves	Proportion	Superordinate Category	Raw Number of Moves	Proportion
Knowledge and Comprehension	194	49	Knowledge and Comprehension	133	33
Comprehension Monitoring	72	18	Construction	128	32
Critical Thinking	63	16	Comprehension Monitoring	70	17
Construction	53	13	Critical Thinking	37	9
Personal Response	11	3	Personal Response	33	8
Total	393		Total	401	

Figure 2. Comparison of Relative Use of Moves in Superordinate Categories by 2 Field Independent Subgroups

used the Personal Response moves least frequently, 3% of the time for the good readers and 8% of the time for the difference poor subjects.

Figure 3 shows the relative use of moves in major categories of the classification system for both field independent subgroups. In the major categories, both subgroups used Signaling in the largest single proportion, 39% for the good readers and 23% for the difference poor readers. The difference poor subjects used the Elaborating move 22% of the time, almost as frequently as they used the Signaling move. Monitoring moves constituted 13% of the verbalizations of the good readers and 14% of those of the difference poor readers, making Monitoring the major move category used second most frequently by the good readers and third most often by the difference poor readers.

Summary of Analysis of Patterns of Moves of Field Independent Good and Difference Poor Readers

Both subgroups used about the same number of moves, but the proportions of those moves were distributed differently among the two subgroups. While both subgroups used Knowledge and Construction moves most frequently, the difference poor subgroup used Construction moves about as often as they did Knowledge and Comprehension. The difference poor readers tended to use Elaborating moves rather than Reasoning moves; they may reflect engagement in

Field Independent Good Readers			Field Independent Difference Poor Readers		
Major Category	Raw Number of Moves	Proportion	Major Category	Raw Number of Moves	Proportion
Signaling	155	39	Signaling	91	23
Monitoring	53	13	Elaborating	88	22
Analyzing	45	11	Monitoring	57	14
Demonstrating	39	10	Demonstrating	42	10
Reasoning	30	8	Reasoning	40	10
Elaborating	23	6	Personal Responses*	33	8
Implementing	19	5	Analyzing	29	7
Judging	18	5	Implementing	13	3
Personal Response*	11	3	Judging	8	2
Total	393		Total	401	

*For comparison, Personal Response is also listed under Major Category since there are no Major Categories subsumed under it.

Figure 3. Comparison of Relative Use of Moves in Major Categories by 2 Field Independent Subgroups

thoughts that digress from the information in the text and result in loss of comprehension.

Question 2: How do field dependent good readers compare to field dependent difference poor readers in the processes they use when reading?

Figure 4 shows the relative use of moves in the superordinate categories of the classification system for both field dependent subgroups. The field dependent good readers used 302 moves, or an average of 75.5 each; the field dependent difference poor readers used 272 moves, or an average of 68 each.

In the superordinate categories, both subgroups used Knowledge and Comprehension moves most frequently, but the difference poor subjects as a subgroup used them proportionally more of the time (55%) than did the good subjects (39%).

The category used second most often by the good readers was Construction, which was used 24% of the time. Critical Thinking was used 18% of the time by the difference poor readers to make it that subgroup's second most used superordinate category.

Comprehension Monitoring ranked third for the good readers, who used it 15% of the time. For the difference poor readers, the third ranked superordinate category was Construction, accounting for 13% of their verbalizations.

Critical Thinking, used 14% of the time by the good

Field Dependent Good Readers			Field Dependent Difference Poor Readers		
Superordinate Category	Raw Number of Moves	Proportion	Superordinate Category	Raw Number of Moves	Proportion
Knowledge and Comprehension	118	39	Knowledge and Comprehension	150	55
Construction	71	24	Critical Thinking	50	18
Comprehension Monitoring	44	15	Construction	34	13
Critical Thinking	43	14	Comprehension Monitoring	31	11
Personal Response	26	9	Personal Response	7	3
Total	302		Total	272	

Figure 4. Comparison of Relative Use of Moves in Superordinate Categories by 2 Field Dependent Reader Subgroups

readers, ranked fourth for that subgroup; Comprehension Monitoring ranked fourth for the difference poor readers, who used that category 11% of the time.

Both groups used Personal Response least often; the good readers used this superordinate category in 9% of their verbalizations and the difference poor group used them in 3%.

Figure 5 shows the relative use of moves in the major categories of the classification system for both field dependent subgroups. In comparing the two subgroups' relative use of the major categories, it is evident that although Signaling is the most frequently used move for both subgroups, the good field dependent readers utilized this move 25% of the time, only about half as often as did the difference poor subjects who used it 47% of the time. The second most frequently used major move of the good readers was Reasoning, used 17% of the time; for the difference poor readers it was Analyzing, used in 18% of their verbalizations. Two major groups of moves each accounted for only 1% of the moves of both the field dependent groups: these were the Implementing and Judging moves.

Field Dependent Good Readers			Field Dependent Difference Poor Readers		
Major Category	Raw Number of Moves	Proportion	Major Category	Raw Number of Moves	Proportion
Signaling	76	25	Signaling	129	47
Reasoning	52	17	Analyzing	49	18
Monitoring	42	14	Monitoring	28	10
Demonstrating	42	14	Reasoning	23	8
Analyzing	40	13	Demonstrating	21	8
Personal Response*	26	9	Elaborating	11	4
Elaborating	19	6	Personal Response*	7	3
Implementing	2	1	Implementing	3	1
Judging	3	1	Judging	1	1
Total	302		Total	272	

*For comparison, Personal Response is also listed as a Major Categories since there are no Major Categories subsumed under it.

Figure 5. Comparison of Relative Use of Moves in Major Categories by 2 Field Dependent Reader Subgroups

Summary of Analysis of Patterns of Moves of Field Dependent Good and Difference Poor Readers

The field dependent subjects who were good readers were slightly more verbal than those who were difference poor readers. The difference poor readers' use of Knowledge and Comprehension moves over half of the time may indicate a tendency to engage in relatively passive reading; their much greater use of Signaling moves rather than Demonstrating moves, both of which are subsumed under Knowledge and Comprehension, provides further evidence that the field dependent difference poor reader may frequently engage in sentence-by-sentence paraphrasing or restatement rather than attempting to integrate the information with either other parts of the text or with his own background knowledge.

Question 3: How do field independent good readers compare to field dependent good readers in the processes they use when reading?

Figure 6 shows the relative use of moves in the superordinate categories of the classification system for both good reader subgroups. The field independent good readers used 393 moves, or an average of 98.25 each. The field dependent good readers used 302 moves, or an average of 75.5 each.

In the superordinate categories, both subgroups used Knowledge and Comprehension moves most frequently, but the

Field Independent Good Readers			Field Dependent Good Readers		
Superordinate Category	Raw Number of Moves	Proportion	Superordinate Category	Raw Number of Moves	Proportion
Knowledge and Comprehension	194	49	Knowledge and Comprehension	118	39
Comprehension Monitoring	72	18	Construction	71	24
Critical Thinking	63	16	Comprehension Monitoring	44	15
Construction	53	13	Critical Thinking	43	14
Personal Response	11	3	Personal Response	26	9
Total	393		Total	302	

Figure 6. Comparison of Relative Use of Moves in Superordiante Categories by 2 Good Reader Subgroups

field independent subjects used them 49% of the time, while the field dependent readers used them as 39% of their moves.

Whereas the field independent subgroup used Construction moves second most often, 24% of the time, the field independent readers made Comprehension Monitoring moves second most frequently, as 18% of their moves.

The superordinate category of moves used third most often by the field independent good readers was Critical Thinking, which they employed 16% of the time; for the field dependent good readers it was Comprehension Monitoring which they used as 15% of their moves.

Construction moves accounted for 13% of the field independent readers' superordinate moves, while Critical Thinking moves made up 14% of those of the field dependent good readers. Both subgroups used Personal Response moves least frequently. While these made up only 3% of the field independent subjects' responses, they made up 9% of those of the field dependent subgroup.

Figure 7 shows the relative use of moves in the major categories of the classification system for both good reader subgroups. The major category of moves used most often by both field independent and dependent good readers was Signaling; the field independent subjects made 39% of their moves in this category, while the field dependent readers made only 25% of their in the Signaling category. Whereas the field dependent good readers used Reasoning moves second

Field Independent Good Readers			Field Dependent Good Readers		
Major Category	Raw Number of Moves	Proportion	Major Category	Raw Number of Moves	Proportion
Signaling	155	39	Signaling	76	25
Monitoring	53	13	Reasoning	52	17
Analyzing	45	11	Monitoring	42	14
Demonstrating	39	10	Demonstrating	42	14
Reasoning	30	8	Analyzing	40	13
Elaborating	23	6	Personal Response*	26	9
Implementing	19	5	Elaborating	19	6
Judging	18	5	Implementing	2	1
Personal Response*	11	3	Judging	3	1
Total	393		Total	302	

*For comparison, Personal Response is also listed as a Major Category since there are no Major Categories subsumed under it.

Figure 7. Comparison of Relative Use of Moves in Major Categories by 2 Good Reader Subgroups

most frequently, 17% of the time, their field independent counterparts used it only 8% of the time, making Reasoning their fifth place move.

Summary of Analysis of Patterns of Moves of Field Independent and Field Dependent Good Readers

Field independent good readers tended to use more moves, especially Knowledge and Comprehension, than the field dependent good readers. Therefore, the field independent good readers were more verbal than those field independent subjects who were difference poor readers. Field dependent good readers' use of Construction moves, especially Reasoning, may help account for their success in reading.

Question 4: How do field independent difference poor readers compare to field dependent difference poor readers in the processes they use when reading?

Figure 8 shows the relative use of moves in the superordinate categories of the classification system for both difference poor reader groups. The field independent difference poor readers used 401 moves, or an average of 100.25 each; the field dependent difference poor readers used 272 moves, or an average of 68 moves each.

In the superordinate categories, both groups used Knowledge and Comprehension moves most frequently, but the field dependent subjects used them 22% more of the time than

Field Independent Difference Poor Readers			Field Dependent Difference Poor Readers		
Superordinate Category	Raw Number of Moves	Proportion	Superordinate Category	Raw Number of Moves	Proportion
Knowledge and Comprehension	133	33	Knowledge and Comprehension	150	55
Construction	128	32	Critical Thinking	50	18
Comprehension Monitoring	70	17	Construction	34	13
Critical Thinking	37	9	Comprehension Monitoring	31	11
Personal Response	33	8	Personal Response	7	3
Total	401		Total	272	

Figure 8. Comparison of Relative Use of Moves in Superordinate Categories by 2 Difference Poor Reader Subgroups

did the field independent group.

Whereas field independent subjects used Construction moves second most frequently, 32% of the time, these moves accounted only for 13% of the field dependent readers' moves, ranking them third in the superordinate categories of the field dependent group.

Critical Thinking moves accounted for 18% of the moves of the field dependent difference poor readers and for 9% of those of the field independent readers.

While Comprehension Monitoring moves were used 17% of the time by the field independent difference poor readers, they were used as 11% of the moves made by the field independent difference poor subjects. Both groups used Personal Response least frequently.

Figure 9 shows the relative use of moves in the major categories of the classification system for both difference poor reader subgroups. The major category of moves used most by both field independent and dependent difference poor readers was Signaling, although the field dependent difference poor reader resorted to use of Signaling twice as often as did the field independent difference poor subjects.

There is a sharp contrast between the two subgroups in the use of Elaborating and Analyzing moves. The field independent difference poor readers used Elaborating moves 22% of the time, while the field dependent difference poor group used them for only 4% of their moves. On the other

Field Independent Difference Poor Readers			Field Dependent Difference Poor Readers		
Major Category	Raw Number of Moves	Proportion	Major Category	Raw Number of Moves	Proportion
Signaling	91	23	Signaling	129	47
Elaborating	88	22	Analyzing	49	18
Monitoring	57	14	Monitoring	28	10
Demonstrating	42	10	Reasoning	23	8
Reasoning	40	10	Demonstrating	21	8
Personal Response*	33	8	Elaborating	11	4
Analyzing	29	7	Personal Response*	7	3
Implementing	13	3	Implementing	3	1
Judging	8	2	Judging	1	1
Total	401		Total	272	

*For comparison, Personal Response is also listed as a Major Categories since there are no Major Categories subsumed under it.

Figure 9. Comparison of Relative Use of Moves in Major Categories by 2 Field Dependent Reader Subgroups

hand, the field dependent difference poor readers used Analyzing moves second most often, 18% of the time, while the field independent difference poor readers used them as 7% of their moves.

Both of these subgroups used Implementing and Judging moves minimally; therefore those moves ranked as the two least frequently used by both subgroups of difference poor readers.

Summary of Analysis of Patterns of Moves of Field Independent and Field Dependent Difference Poor Readers

The data comparing these two groups may provide some evidence that even among poor readers those who are field independent tend to take a more active role. First, the field independent difference poor readers tended to use more moves than the field dependent difference poor readers, thus indicating that at least overtly they were engaging in more processing. Furthermore, Knowledge and Comprehension Moves, especially Signaling, accounted for about half of the moves of those difference poor readers who were field dependent. The heavy reliance of this subgroup on Signaling moves which involve restatement or paraphrasing of material, may be further indication of their taking a more passive approach to reading. The field independent difference poor readers' use of Signaling and Elaborating moves in about equal proportion provides more evidence that those difference poor

readers who are field independent may take a more active role in attempting to build meaning as they read.

Summary of Questions Relating to the Four Subgroups

Both the field independent good reader subgroup and the field dependent good reader subgroup used about the same number of moves when processing the three passages. Likewise, the field dependent good reader subgroup and the field dependent difference poor reader subgroup also were very similar in the amount of processing they verbalized for these passages. On the other hand, the field independent good reader subgroup produced an average of 22.75 more moves per subject than the field dependent good reader subgroup. Furthermore, the difference poor subgroups differed even more in the total number of moves verbalized for the three passages; the field independent difference poor readers made an average of 32.25 more moves each than did the field dependent difference poor subgroup. This may be evidence that cognitive style rather than reading proficiency accounts for how much verbalized thought readers produce. It also suggests that perhaps there is a difference in the quantity but not the quality of actual thought engaged in by the two groups when they read.

Several other similarities exist among all four subgroups: Knowledge and Comprehension was the most frequently used superordinate category for all subgroups;

and Signaling, a subcategory of Knowledge and Comprehension, was the most often used major category. The superordinate category of moves used least often by all subgroups was Personal Response. No other similarities were found among the four subgroups. Therefore, it is concluded that these four subgroups of readers differed greatly in the proportional use of various categories of moves engaged in while reading the same three passages.

Part III: Questions Relating to Individual Subjects and to Case Studies

Question 1: Do individual readers employ characteristic patterns of moves which might be considered comprehension styles?

Table 18 shows the patterns of moves of all field independent subjects for each of the three passages and for the three passages combined. Table 19 shows the same data for all field dependent subjects. The actual number of moves made by each subject in each superordinate and major category is provided for comparison of the actual frequency of moves of the individual readers. Individual subjects varied greatly on the total number of moves made on the three passages combined. Subject E made a total of only 57 moves, while Subject L made 186 moves on the same three passages. Both Subject E and Subject L were field independent good readers. The fewest moves made on the

TABLE 18

Patterns of Moves Made by Field Independent Subjects

in Each Superordinate and Major Category in Each Passage

	Field Independent Good Readers												Field Independent Difference Poor Readers											
Subject	E			I			J			L			D			N			O			P		
Passage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Comprehension Monitoring	3	3	2	1	2	3	4	1	2	22	19	10	12	8	1	5	0	1	10	13	3	3	4	10
Monitoring	3	2	2	1	2	2	3	1	1	18	13	7	11	7	0	5	0	1	10	9	2	3	2	7
Implementing	0	1	2	0	0	1	1	0	1	4	6	3	1	1	1	0	0	0	0	4	1	0	2	3
Construction	2	3	0	4	1	3	2	5	2	10	13	8	5	1	3	9	3	12	19	13	20	13	9	21
Elaborating	0	2	0	0	1	3	0	4	2	5	3	3	0	0	3	1	0	1	10	12	19	12	9	21
Reasoning	2	1	0	4	0	0	2	1	0	54	10	5	5	1	0	8	3	11	9	1	1	1	0	0
Knowledge and Comprehension	10	5	15	15	12	26	19	16	23	18	22	13	5	8	9	15	17	26	10	18	8	0	5	12
Signaling	4	4	15	14	8	15	18	14	16	16	18	13	4	7	9	5	10	16	8	16	4	0	4	8
Demonstrating	6	1	0	1	4	11	1	2	7	2	4	0	1	1	0	10	7	10	2	2	4	0	1	4
Critical Thinking	0	9	5	1	1	2	1	1	1	6	12	24	0	3	8	0	1	6	1	4	7	0	4	3
Analyzing	0	9	5	1	0	2	0	0	1	4	7	16	0	2	5	0	1	6	1	2	6	0	3	3
Judging	0	0	0	0	1	0	1	1	0	2	5	8	0	1	3	0	0	0	0	2	1	0	1	0
Personal Response	0	0	0	0	1	1	0	0	0	0	1	8	2	0	1	1	0	0	3	6	9	1	6	4
TOTAL PER PASSAGE	15	20	22	21	17	35	26	23	28	56	67	63	24	20	22	30	21	45	43	54	47	17	28	50
TOTAL PER SUBJECT		57			73			77			186			66			96			144			95	

Passage 1 = Waugh; Passage 2 = Social Institutions; Passage 3 = Biosphere

TABLE 19

Patterns of Moves Made by Field Dependent Subjects

in Each Superordinate and Major Category in Each Passage

	Field Dependent Good Readers												Field Dependent Difference Poor Readers											
Subject	F			G			H			K			A			B			C			M		
Passage	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Comprehension Monitoring	8	0	2	1	7	6	2	2	7	0	5	4	3	1	1	8	2	5	4	0	1	1	0	5
Monitoring	8	0	1	1	7	6	2	2	6	0	5	4	3	1	1	8	2	5	3	0	0	1	0	4
Implementing	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1
Construction	9	3	11	5	1	8	13	2	5	6	1	7	6	1	1	6	3	4	6	3	1	2	1	0
Elaborating	3	3	5	0	0	0	3	2	1	1	0	1	0	1	1	0	0	2	2	3	1	0	1	0
Reasoning	6	0	6	5	1	8	10	0	4	5	1	6	6	0	0	6	3	2	4	0	0	2	0	0
Knowledge and Comprehension	10	9	6	10	9	4	7	10	13	14	12	14	18	12	23	11	7	13	10	6	8	16	13	13
Signaling	9	8	5	2	8	3	1	1	6	8	11	14	15	11	16	11	7	10	8	6	8	13	11	13
Demonstrating	1	1	1	8	1	1	6	9	7	6	1	0	3	1	7	0	0	3	2	0	0	3	2	0
Critical Thinking	2	10	14	0	1	2	1	1	6	1	3	2	0	5	1	4	7	6	5	4	13	0	4	1
Analyzing	2	9	14	0	1	1	1	1	6	1	2	2	0	5	1	4	7	6	5	4	12	0	4	1
Judging	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
Personal Response	1	4	1	0	1	6	0	0	5	0	2	6	0	0	0	1	0	2	0	0	1	0	1	2
TOTAL PER PASSAGE	30	26	34	16	19	26	23	15	36	21	23	33	27	19	26	30	19	30	25	13	24	19	19	21
TOTAL PER SUBJECT		90			61			74			77			72			79			62			59	

Passage 1 = Waugh; Passage 2 = Social Institutions; Passage 3 = Biosphere

individual passages were as follows: on the "Waugh" passages, 15 moves were made by Subject E, a field independent good reader; on the "Social Institutions" passages, 13 moves were made by Subject C, a field dependent difference poor reader; and on the "Biosphere" passage, 21 moves were made by Subject M, a field dependent difference poor reader. On all three passages the highest number of moves were made by Subject L, a field independent good reader.

Tables 18 and 19 also show that readers vary in the relative number of moves they make in response to the three passages. For example, the "Waugh" passage elicited the largest number of responses made by Subjects A, B, C, and D, all of whom were difference poor readers. On the other hand, the "Waugh" passages resulted in the fewest moves made by subjects G, K, I, L, O, P, and M; three of those subjects were difference poor readers.

Tables 20, 21, 22, and 23 represent the proportion of moves made by each subject in each superordinate category on each of the three passages and on the three passages together. In cases where a subject used the same proportion of moves in two or three different categories, those categories are listed together. These tables permit comparison of ratios of moves (1) by individual subjects on different passages and (2) among subjects. Observation of the patterns in these data reveals that individual subjects

Table 20

Relative Proportions of Moves Made by Individual Field Independent Good Readers in Superordinate Categories on 3 Separate Passages and 3 Passages Combined

Subject	Passage	Largest Proportion	→	→	→	Smallest Proportion
E	Waugh	K&C 67	CM 20	C 13		CT 0 PR 0
	Social Institutions	CT 45	K&C 25	CM 15 C 15		PR 0
	Biosphere	CT 41	C 32	K&C 18	CM 6	PR 0
	Total	K&C 53	CT 25	CM 14	C 9	PR 0
I	Waugh	K&C 71	C 19	CM 5 CT 5		PR 0
	Social Institutions	K&C 71	CM 12	C 6 CT 6 PR 6		
	Biosphere	K&C 74	CM 9 C 9		CT 6	PR 3
	Total	K&C 73	C 11	CM 8	CT 5	PR 3
L	Waugh	CM 39	K&C 32	C 18	CT 11	PR 0
	Social Institutions	K&C 33	CM 28	C 19	CT 18	PR 0
	Biosphere	CT 38	K&C 21	CM 16	C 13 PR 13	
	Total	K&C 28	CM 27	CT 23	C 17	PR 5
J	Waugh	K&C 73	CM 15	C 8	CT 4	PR 0
	Social Institutions	K&C 70	C 22	CM 4 CT 4		PR 0
	Biosphere	K&C 82	CM 7 C 7		CT 4	PR 0
	Total	K&C 75	C 12	CM 9	CT 4	PR 0

CM = Comprehension Monitoring
K&C = Knowledge & Comprehension
C = Construction
CT = Critical Thinking
PR = Personal Response

Table 21

Relative Proportions of Moves Made by Individual Field Independent Difference Poor Readers in Superordinate Categories on 3 Separate Passages and 3 Passages Combined

Subject	Passage	Largest Proportion →	→	→	Smallest Proportion
D	Waugh	CM 50	C 21 K&C 21	PR 8	CT 0
	Social Institutions	CM 40 K&C 40	CT 15	C 5	PR 0
	Biosphere	K&C 41	CT 36	C 14	CM 5 PR 5
	Total	K&C 33	CM 32	CT 17	C 14 PR 5
N	Waugh	K&C 50	C 30	CM 17	PR 3 CT 0
	Social Institutions	K&C 81	C 14	CT 5	CM 0 PR 0
	Biosphere	K&C 58	C 27	CT 13	CM 2 PR 0
	Total	K&C 60	C 25	CT 7	CM 6 PR 0
O	Waugh	C 44	CM 23 K&C 23	PR 7	CT 2
	Social Institutions	K&C 33	CM 24 C 24	PR 11	CT 7
	Biosphere	C 43	PR 19	KC 17	CT 15 CM 6
	Total	C 36	K&C 25	CM 18	PR 13 CT 8
P	Waugh	C 76	CM 18	PR 3	K&C 0 CT 0
	Social Institutions	C 32	PR 21	K&C 18	CM 14 CT 14
	Biosphere	C 42	K&C 24	CM 20	CT 16 PR 8
	Total	C 45	CM 18 K&C 18		PR 12 CT 7

CM = Comprehension Monitoring
K&C = Knowledge & Comprehension
C = Construction
CT = Critical Thinking
PR = Personal Response

Table 22

Relative Proportions of Moves Made by Individual Field Dependent Good Readers in Superordinate Categories on 3 Separate Passages and 3 Passages Combined

Subject	Passage	Largest Proportion	→	→	→	Smallest Proportion
F	Waugh	K&C 33	C 30	CM 27	CT 7	PR 3
	Social Institutions	CT 38	K&C 35	PR 15	C 12	CM 0
	Biosphere	CT 41	C 32	K&C 18	CM 6	PR 3
	Total	CT 29	K&C 28	C 26	CM 11	PR 7
G	Waugh	K&C 63	C 31	CM 6		CT 0 PR 0
	Social Institutions	K&C 47	CM 37	C 5 CT 5 PR 5		
	Biosphere	C 31	CM 23 PR 23		K&C 15	CT 8
	Total	K&C 38	CM 23 C 23		PR 11	CT 5
H	Waugh	C 57	K&C 30	CM 9	CT 4	PR 0
	Social Institutions	K&C 67	CM 13 C 13		CT 7	PR 0
	Biosphere	K&C 36	CM 19	CT 17	C 14 PR 14	
	Total	K&C 41	C 27	CM 15	CT 11	PR 7
K	Waugh	K&C 67	C 29	CT 5		CM 0 PR 0
	Social Institutions	K&C 52	CM 22	CT 13	PR 9	C 4
	Biosphere	K&C 42	C 21	PR 18	CM 12	CT 6
	Total	K&C 52	C 18	CM 12	PR 10	CT 8

CM = Comprehension Monitoring
K&C = Knowledge & Comprehension
C = Construction
CT = Critical Thinking
PR = Personal Response

Table 23

Relative Proportions of Moves Made by Individual Field Dependent Difference Poor Readers in Superordinate Categories on 3 Separate Passages and 3 Passages Combined

Subject	Passage	Largest Proportion	→	→	→	Smallest Proportion
A	Waugh	K&C 67	C 22	CM 11		CT 0 PR 0
	Social Institutions	K&C 63	CT 26	CM 5 C 5		PR 0
	Biosphere	K&C 88	CM 4 C 4 CT 4			PR 0
	Total	K&C 74	C 11	CT 8	CM 7	PR 0
B	Waugh	K&C 37	CM 27	C 20	CT 13	PR 3
	Social Institutions	K&C 37 CT 37		C 16	CM 11	PR 0
	Biosphere	K&C 43	CT 20	CM 17	C 13	PR 7
	Total	K&C 39	CT 22	CM 19	C 16	PR 2
C	Waugh	K&C 43	C 26	CT 22	CM 17	PR 0
	Social Institutions	K&C 46	CT 31	C 23		CM 0 PR 0
	Biosphere	CT 54	K&C 33	CM 4 C 4 PR 4		
	Total	K&C 39	CT 35	C 16	CM 8	PR 2
M	Waugh	K&C 84	C 11	CM 5		CT 0 PR 0
	Social Institutions	K&C 68	CT 21	C 5 PR 5		CM 0
	Biosphere	K&C 62	CM 24	CT 5		C 0 PR 0
	Total	K&C 71	CM 10	CT 8	C 5 PR 5	

CM = Comprehension Monitoring
K&C = Knowledge & Comprehension
C = Construction
CT = Critical Thinking
PR = Personal Response

vary in both the proportions of moves they make in the different categories and in the consistency with which they make the moves. For example, Subjects B, I, J, and N demonstrated relatively consistent patterns of moves. On the other hand, Subjects G, L, and O showed wide variation in both the proportions and relative use of moves. Six subjects, A, I, J, K, M, and N, used Knowledge and Comprehension consistently as their sole move of highest proportion, while Subject P used Construction move consistently most frequently. While most subjects used all categories at least minimally, three subjects, A, E, and J, did not use any Personal Response moves. In contrast, Personal Response moves were used in second greatest proportion by Subject O on the "Biosphere" passage and by Subject P on the "Social Institutions" passage.

The data on both the raw number of moves and the proportional moves of the individual subjects indicate that although there may be similarities in patterns of moves of groups of subjects, there is a wide variety in the patterns of moves of individual subjects in relationship to each other and to individual passages. This may be evidence that many readers, field independent and field dependent as well as good and difference poor, change their strategies according to the material they are reading.

Question 2: How do reading proficiency and cognitive style relate to comprehension?

In order to analyze individual readers' comprehension styles as they related to reading proficiency and field dependence, the researcher studied each individual subject's responses to at least one specific aspect of each of the three passages.

Responses to Non-Salient Words in "Waugh" Passage

A primary potential problem in the "Waugh" passage is caused by the inductive manner through which the narrator discusses the idea that he has become disillusioned with the army. This idea is first introduced in the third and fourth sentences and is continued through as extended analogy in which the narrator's loss of love for the army is compared to a husband's loss of love for his wife. Sentences three and four read:

> Here my last love died. (sentence three)
>
> There was nothing remarkable in the manner of its death. (sentence four)

Figure 10 tracks the subjects' understanding of the passage at three points. First, it shows whether each subjects' responses to sentence 5 indicated any awareness that the word it implies that it was not a human being that was his "last love" and now has died. Seven readers gave indication of such awareness through statements such as these:

> "Now I know it's not a human being. The word its is used."

Subject	Awareness of Impact of *it* in Sentence 5		Awareness of Impact of *like* in Sentence 9		Understanding of Source of Narrator's Dissatisfaction		
	Yes	No	Yes	No	Accurate	Confused	Inaccurate
FIGR*							
E		X	X		X		
I	X		X			X	
J		X		X			X
L	X		X		X		
FIDPR*							
D	X			X			X
N		X	X				X
O	X		X			X	
P		X		X			X
FDGR*							
F		X	X			X	
G	X			X		X	
H		X	X			X	
K		X	X				X
FDDPR*							
A	X		X			X	
B	X		X				X
C		X		X			X
M		X	X		X		
TOTALS							
Field Ind.	4	4	5	3	2	2	4
Field Dep.	3	5	6	2	1	4	3
Good	3	5	6	2	2	4	2
Dif. Poor	4	4	5	3	1	2	5

*FIGR = Field Independent Good Readers
FIDPR = Field Independent Difference Poor Readers
FDGR = Field Dependent Good Readers
FDDPR = Field Dependent Difference Poor Readers

Figure 10. Tracking of Individual Subjects' Understanding of "Waugh" Passage at 3 Points

"Maybe they're talking about the fact that their youth or something else died."

One subject, Subject N, gave clear indication that he had missed the clue altogether:

"I guess if it was or wife or whoever that died, he's taking it out on somebody else."

The other eight readers gave no indication that they did or did not attend to the clue; instead they tended to focus on the manner of the death:

"There wasn't any big mystery about the death. It was just an ordinary death."

"It sounds like the death was natural because they say 'there was nothing remarkable.'"

After a four-sentence digression during which the narrator thinks about other things, the idea of his being disenchanted with the army is continued in sentence 9:

> As I lay in that dark hour, I was aghast to realize that something within me, long sickening, had quietly died, and felt as a husband might feel, who, in the fourth year of his marriage, suddenly knew that he had no longer any desire, or tenderness, or esteem, for a once-beloved wife; no pleasure in her company, no wish to please, no curiosity about anything she might ever do or say or think: no hope of setting things right, no self-reproach for the disaster.

Figure 10 also shows whether the reader's verbalized thoughts in response to that sentence give indication of his having observed the word <u>like</u>. Eleven subjects made statements that revealed that they had detected the simile. Examples of such verbalized thoughts include these:

"He is not married but he has lost something."

"He obviously lost something inside him, lost the way he feels about something."

The other five readers made statements that clearly indicated that they had not successfully processed the word like in relationship to the rest of the sentence and they made statements of which the following are representative:

"Well, he's lying there thinking in his bed about his marriage and that he had no more interest in his wife at all."

"It seems like he loves his job more than he does his wife and he feels bad about it."

Figure 10 also shows each reader's ultimate understanding of the passage as reflected in his summary of the passage. Accurate understanding was measured by the inclusion of a statement indicating that the reader knew that it was the army with which the narrator was dissatisfied. Confused understanding was measured by the inclusion of a statement indicating that the reader was uncertain as to whether the narrator was dissatisfied with the army or with a woman. Inaccurate understanding was measured by a statement indicating that the reader had made a totally incorrect interpretation of the cause of the narrator's dissatisfaction.

The bottom portion of Figure 10 summarizes the results of the analysis by cognitive style group and by reading proficiency group. These results provide some indication that reading proficiency and cognitive style were not closely related to how these individual readers responded to

these textual factors. First, they differed widely in the attention they paid to the cue word in sentence 5. The cue was overtly attended to by four field independent subjects and three field dependent subjects. Furthermore, three good readers and four difference poor readers indicated awareness of the cue word's impact on the meaning of the previous sentence.

Secondly, whether or not the readers observed the simile in sentence 9 bore little relationship to either their field dependence or reading proficiency status. Of the five subjects who interpreted the sentence in a manner that indicated lack of awareness of the simile, at least one subject was from each of the four subgroups.

Thirdly, they differed in their final understanding of the passage. Only two field independent good readers and one field dependent difference poor reader clearly understood the source of the narrator's dissatisfaction. At least one reader in each subgroup displayed confusion in the summary. An inaccurate summary was given by at least one subject in each subgroup, but the difference poor readers did account for 5 of the 7 inaccurate summaries, thereby suggesting some relationship between final understanding and reading proficiency.

Finally, there apparently was little relationship between subjects' verbalized awareness of the impact of the clue words <u>it</u> and <u>like</u> and their ultimate expressed

understanding of the passage. For example, only one subject, Subject L, indicated awareness of the impact of both clue words and also gave an accurate summary. Subject A and B both recognized the significance of the clue words but later produced inaccurate summaries; this may indicate that some difference poor readers comprehend but fail to retain vital pieces of information. In contrast, two readers, Subject E and Subject M, did not indicate awareness of the impact of the first clue word but did evidently observe the simile and later gave accurate summaries.

One observation regarding these data may provide some evidence for the theory that field dependent readers tend to focus on salient clues. Among the readers who did not overtly respond to the clue word <u>it</u> were seven whose verbalizations focused on other words in the sentence, namely "the manner of death" or <u>death</u>. Five of those seven subjects were field dependent. Perhaps in processing the sentence they had indeed focused on the more salient word <u>death</u> rather than the less salient <u>it</u>.

Concept Differentiation in "Social Institutions" Passage

The "Social Institutions" passage has as its purpose the differentiation between the concepts of "social institutions" and "social groups and organizations." To analyze how the individual readers processed this passage, the researcher studied each subject's moves on the passage

in an attempt to find trends in the use of moves. Several subjects evidenced specific ways of responding to the text, but their summaries of the passage provided evidence that they did not understand the difference between the terms discussed. For example, a field dependent good reader, Subject H, made nine attempts to interpret the information by using Demonstrating Comprehension moves, but these were erroneous; therefore, he could not successfully differentiate between the two concepts. Subject C, a field dependent difference poor reader made only one move per sentence; these moves were mostly Signaling moves or Analysis moves whereby the subject pointed out the function of the sentence in the paragraph. That subject too failed to differentiate between the two concepts presented in the passage. No trends in the use of specific strategies involving use of Comprehension Monitoring or Construction moves could be found.

Next the researcher compared subjects' summaries of the passage with their designations of reading proficiency and cognitive style. Table 24 presents data on three kinds of summaries that were produced: (1) global representations of the topic without differentiation between concepts; (2) successful differentiation of the concepts; or (3) unsuccessful differentiation of the concepts. Here an interesting trend emerged. Although field dependence theory suggests that field independent subjects tend to be more

Table 24

Subjects' Differentiation of Concepts in

Summarizing "Social Institutions" Passage

	No Attempt to Differentiate	Attempt to Differentiate		
		Total	Successful	Unsuccessful
SUBGROUPS				
4 Field Independent Good Readers	0	4	2	2
4 Field Independent Difference Poor Readers	3	1	0	1
4 Field Dependent Good Readers	1	3	1	2
4 Field Dependent Difference Poor Readers	2	2	1	1
GROUPS				
8 Field Independent Subjects	3	5	2	3
8 Field Dependent Subjects	3	5	2	3
8 Good Readers	1	7	3	4
8 Difference Poor Readers	5	3	1	2

analytical and therefore also more likely to differentiate between concepts, there was no difference found between the field independent and field dependent groups. On the other hand, there was a difference between the good and difference poor readers; more of the good readers tried to explain the difference than did the difference poor readers. Although the numbers of subjects in the groups were small, this may indicate that the good readers focused their attention on trying to differentiate between the concepts whereas the difference poor readers focused their attention on the topic as a whole.

Imagery in "Biosphere" Passage

The "Biosphere" passage began with these sentences instructing the reader to use imagery:

> Think of a basketball with a postage stamp glued to it. (sentence 1)
>
> Picture next how thin the ink on that stamp is. (sentence 2)

Table 25 shows how the individual subjects responded to these sentences. Subjects who assumed a participant role were those who indicated through their verbalized thoughts that they were engaging in the imagery as suggested through statements such as these:

> "I'm thinking of a basketball with a postage stamp glued to it."

Table 25

Subjects' Responses to Instructions to Use Imagery in "Biosphere" Passage

	Participant Role	Observer Role		
		Total	Passive Observer	Critical Observer
SUBGROUPS				
4 Field Independent Good Readers	3	1	1	0
4 Field Independent Difference Poor Readers	3	1	1	0
4 Field Dependent Good Readers	0	4	1	3
4 Field Dependent Difference Poor Readers	1	3	3	0
GROUPS				
8 Field Independent Subjects	6	2	2	0
8 Field Dependent Subjects	1	7	4	3
8 Good Readers	3	5	2	3
8 Difference Poor Readers	4	4	4	0

"I'm picturing how thin the ink might be on a stamp."

Subjects who assumed an observer role were those who indicated that they were not engaging in imagery. The passive observers either hypothesized about the sentences' purpose or viewed the sentences as statements rather than directives. Three subjects, all field dependent difference poor readers, indicated lack of understanding. Examples of passive observer responses included the following:

> "It sounds like you're going to send a basketball through the mail to somebody."
>
> "Maybe the traveling that a basketball team has to do, kind of like mail, if you are a pro-basketball player."
>
> "It says to think of a basketball that has a stamp glued on it. I don't know what that's supposed to mean."

The critical observers responded with affective statements such as these:

> "I like basketball, so this might be pretty good."
>
> "This is weird. They tell you to picture how thin the ink is on the stamp. I'm not paying any attention to that."

None of the four field dependent good readers assumed the participant role. Furthermore, three of them provided observer responses that included some affective content. Of the eight field dependent readers as a group, only one indicated that he was engaging in the imagery as directed to do, while 6 of the 8 field independent readers said that they were visualizing what they were told to picture.

These results may provide some evidence that field

independent readers tend to engage in imagery more freely than those who are field dependent.

Affective Response to "Biosphere" Passage

The "Biosphere" passage explains the parts of the biosphere and the relationships of the closed chemical system and the open energy system to the life cycle within the biosphere. The passage evoked a number of responses which indicated attitude, motivation, or affect on the part of the readers. Therefore, the researcher decided to analyze the relationship of these responses to the reading proficiency and cognitive styles of the subjects. Table 26 indicates the results of this analysis.

Those readers who showed no affect expressed neither enjoyment or interest in the passage nor displeasure or impatience with it. Those who expressed confusion or frustration made statements such as these:

> "It was a really hard paragraph. I really didn't understand it too well."
>
> "Now I'm becoming a little bit confused as to what they're getting at. . . . I don't see exactly where they're going with it."

In his summary the same subject said:

> "That was a pretty tough one."

Those readers who expressed dislike of the content made negative comments regarding the content or the writing. These examples are representative of statements that

Table 26

Subjects' Affective Responses to "Biosphere" Passage

	No Affect	Affect	*Type of Affective Response		
			Confusion/ Frustration	Dislike of Content/Style	Negative Reaction to Language
SUBGROUPS					
4 Field Independent Good Readers	3	1	1	1	0
4 Field Independent Difference Poor Readers	4	0	0	0	0
4 Field Dependent Good Readers	0	4	1	3	3
4 Field Dependent Difference Poor Readers	1	3	1	0	2
GROUPS					
8 Field Independent Readers	7	1	1	1	0
8 Field Dependent Readers	1	7	2	3	5
8 Good Readers	3	5	2	4	3
8 Difference Poor Readers	5	3	1	0	2

expressed such negativism:

> "This is becoming boring. It makes me not want to read it."
>
> "Oh, this is so science related and I hate science."
>
> "This sounds like science and I don't like science too much."
>
> "Whoever wrote this is a little bit strange."

Subjects who reacted negatively to the language made statements such as these:

> "I think they should have explained what a geosphere and a biosphere were for somebody who didn't know anything about this." (The passage had explained those terms.)
>
> "Again, I don't understand why they use different words to try to mean something else without just coming out and saying what it really is."
>
> "Why don't they talk English? What's a geosphere?" (The sentence the subject was responding to had defined the word geosphere.)

The analysis of individual subjects' affective reactions to the passage revealed that 7 of the 8 field independent readers displayed no emotional reaction to the passage. On the other hand, 7 of the 8 field dependent readers did express negative feelings. This may be evidence that field dependent readers tend to find science's emphasis on the analytical alien to their preferred mode of experiencing the world, or it may indicate that field dependent readers tend to be more open in revealing negative responses to what they read.

Summary

When the relationships of reading proficiency and cognitive style to comprehension style were measured through analysis of the ways subjects responded to specific aspects of the three passages read, several possible relationships were suggested. First, classification as a difference poor reader appeared to be related to total misunderstanding of the "Waugh" passage, while verbalized evidence of attention to two important but non-salient clue words did not appear to be related to either cognitive style or reading proficiency.

Classification as a good reader tended to be associated with attempts to differentiate between two sociological terms in the "Social Institutions" passage.

Field independent cognitive style was related to participation in the suggested imagery in the "Biosphere" passage, while on the same passage a field dependent cognitive style tended to be associated with reader statements which reflected negative affect towards the topic in general and/or something specific about the passage itself.

The numbers of subjects in the cognitive style and reading proficiency groups were small and the analyses were based on subjective judgment of the researcher. Therefore, these results must be interpreted only as suggestions of

possible relationships. Nevertheless, they do suggest that perhaps cognitive style and reading proficiency are in some ways related to comprehension style, as evidenced in certain ways subjects tend to respond to various aspects of text.

Case Studies

The following four case studies continue to provide answers to the questions asked about all the individual subjects:

Question 1: Do individual readers employ characteristic patterns of moves which might be considered comprehension styles?

Question 2: How do reading proficiency and cognitive style relate to comprehension style?

In addition, these case studies discuss these readers' perceptions of themselves as readers and they trace the manner in which these subjects processed the three passages.

Walt

Walt was an 18 year old university freshman when he participated in the study. He was majoring in telecommunications with the goal of becoming a cinematographer. His verbal SAT score was 340 and his math SAT score was 430. Identified as a field independent good reader, Walt's GEFT score was 11 and his Nelson Denny Reading Test Grade level scores were: Vocabulary 13.3,

Comprehension 13.8, Total 13.4. He produced 73 moves for the three passages read. The average number of moves made by field independent subjects was 99.3 and by good readers was 86.9. Therefore, he was not as verbal as other subjects in those groups tended to be.

Walt's pattern of moves is presented in Table 27. Both raw and proportional numbers are indicated.

His pattern shows consistency in that the largest proportion of his moves are always in Knowledge and Comprehension. He makes relatively few Critical Thinking moves and always displays Personal Response moves among those least often made.

Walt describes himself as "not a bad reader" who reads "fast enough," but is dissatisfied with the amount of reading he does. He sees himself as a reluctant reader who likes books he is assigned to read, but he does not have the desire to read books voluntarily. Although he does not watch much television, he says he would do just about anything else rather than choose to sit down and read. In contrast, he considers a good reader to be "someone who reads a great deal on many different topics."

Among his earlier experiences he remembers having been read to by his parents. He also recalls having done exercises in phonics books in kindergarten; he says that the work was "boring" but he did enjoy the pictures that accompanied the exercises. His attraction to the pictorial

Table 27

Pattern of Moves of Walt

	Waugh Raw	Waugh Prop	Soc. Instit. Raw	Soc. Instit. Prop	Biosphere Raw	Biosphere Prop	Total Raw	Total Prop
Comprehension Monitoring	**1**	**5**	**2**	**12**	**3**	**9**	**6**	**8**
Monitoring	1	5	2	12	2	6	5	7
Implementing	0	0	0	0	1	3	1	1
Construction	**4**	**19**	**1**	**6**	**3**	**9**	**8**	**11**
Elaborating	0	0	1	6	3	9	4	5
Reasoning	4	19	0	0	0	0	4	5
Knowledge and Comprehension	**15**	**71**	**12**	**71**	**26**	**74**	**53**	**73**
Signaling	14	71	8	47	15	43	37	51
Demonstrating	1	5	4	24	11	31	16	22
Critical Thinking	**1**	**5**	**1**	**6**	**2**	**6**	**4**	**5**
Analyzing	1	5	0	0	2	6	3	4
Judging	0	0	1	6	0	0	1	1
Personal Response	**0**	**0**	**1**	**6**	**1**	**3**	**2**	**3**
Raw Total	21		17		35		73	

appears to pervade all his positive associations with reading. For example, he remembers a children's book about fire engines in which he "loved the color of the bright orange and red flames." He also enjoyed a book about insects which had "complicated language," but he confesses that he "just read the captions because there were really beautiful photos with the most vivid colors."

In eighth grade he began reading and enjoying books assigned and developed an especially close identification with the characters in The Catcher in the Rye. In high school he also began reading magazines, including American Cinematographer, a periodical in his major field of interest.

Walt says he feels confident of his ability to handle the demands of college reading but admits to frequently avoiding reading assignments, so he falls behind in his reading. He says he finds much literature difficult and refers to a college literature course he is taking as an example of the difficulty he finds with the subject.

When he reads, he says he tends to focus on words he doesn't know, usually highlighting or underlining them; sometime he goes back to them, especially if the word is crucial to his understanding of the meaning. He also enjoys learning foreign words that are used in the English language and has fun making up words based on foreign roots and affixes.

Walt enjoys writing and takes pleasure in what he calls "literary doodling" whereby he engages in a kind of "stream of consciousness" writing. He sees an important connection between reading and writing and feels that by developing the habit of reading more he could become a better writer.

Walt thought that the think aloud process used in gathering the protocols for the study was "only slightly" related to how he normally processes information when reading because he found himself to be "not relaxed" and was distracted by the tape recorder, the researcher's presence and the necessity of verbalizing his thoughts. These factors may account for some comprehension problems he experienced.

For the most part Walt is a linear reader who processes text sentence by sentence. Over 70% of Walt's responses to the three passages were categorized as Knowledge and Comprehension.

Likewise, in nine of the 14 sentences in the "Waugh" passage he responded with only one move, either a paraphrase or restatement. In one section of the passage he did demonstrate more active approaches which seem to have been triggered by his difficulty with recognition of a word in sentence 3:

> Well, I don't know what the word <u>reveal</u> (how subject pronounced <u>reveille</u>) means, so I can't understand the sentence too well.

He processed sentences 4 and 5 by paraphrasing and

going still further to create an imaginative picture of the way the death may have occurred. His attention to the word it facilitated his creating of the hypothesis:

> "My last love died." I guess he means "only love died." It's all over.
>
> The death, I'm thinking of an animal because it says "its," "its death," so I'm thinking of a pet, a frog, and it just died in a regular way. It just closed its eyes and fell on its back or something. That was it.

Then in sentence 6 he encountered the word reveille again. In this context he was able to recognize it and use the word in building a hypothesis about the setting:

> Oh, it's reveille. OK, I know what the word is. It's about a camp, I guess a military camp, a soldier training camp, and right before bedtime he just has different thoughts going through his mind.

After clearly understanding a three-sentence diversion from the main idea, Walt resorted to a mechanical sentence-by-sentence paraphrasing of the rest of the passage. His failure to persist in attempting to clarify the interpretation of an ambiguously presented idea had the ultimate effect of leaving him with an awareness that he had not satisfactorily solved the problem of finding the meaning of the word it in sentence 5. This lack of resolution of the ambiguity is evident in his summary of the passage:

> It seems like it's about a man, how, I don't know, I'm kind of tossed up if it's talking about war or if he's talking about his wife, how it's very different than he thought it would be in the beginning and it changed. He thought he knew it very well, his wife very well, for example, and now all of a sudden he lost his love for her and

> she's very different than he thought she would be after many years and his attitude has changed.

In reading the "Social Institutions" passage, Walt again displayed a lack of clear understanding of the paragraph. Again he relied primarily on Knowledge and Comprehension moves, never making more than two moves in any sentence. The result of this approach was a sentence-by-sentence paraphrasing which was sometimes erroneous, as seen in sentence 3:

> This says that institutions are groups of people with a goal, and organizations are just groups of people that might not have a goal.

On this passage Walt made no attempt to use Reasoning moves and he used only one Elaborating move which added nothing to his understanding. Therefore, he did nothing to construct meaning. Instead he made statements that reflected passive judgmental responses to the material:

> It just says that education, for example, is an institution; and college, the University of Vermont, is an organization. It doesn't really tell me anything.

Two times he engaged in Monitoring moves, but these statements expressing lack of understanding were not followed by any active approaches to facilitate understanding:

> OK, I don't know what exactly "concrete entities" are.

> I don't really understand what they mean by "institution is an abstraction." It's not the same thing as an organization.

Walt's approach to the "Social Institutions" passage did not include the kinds of analytical behaviors expected of a field independent reader. Therefore he did not clearly differentiate between the two concepts. His summary revealed this failure to analyze the passage as well as an accompanying distaste for the material which may have been the underlying cause of the mechanical approach he took in reading the passage:

> The paragraph, I think it's a pretty boring story. I think it's about telling what the differences and what are the characteristics of organizations and institutions: groups of people compared to groups of people with a motive for a common cause. You know, a family, so on, the members that make it up.

In contrast to the "Waugh" and "Social Institutions" passages, Walt read the "Biosphere" passage in a more active manner. In this passage he readily engaged in sensory imagery when directed to do so:

> OK, I just thought of a basketball with a stamp stuck on the side of it sitting in the middle of a gym floor.
>
> Well, the first thing I thought of when I was thinking of a stamp and that the stamp was on the basketball is how thin the ink is. I thought of very fine detail on the stamp. Then for some reason, I just thought of a wet blotch of ink.

He continued to use imagery without being prompted to do so in order to make an interpretation of the meaning of sentence 3:

> Now it's comparing the population of people on earth with the amount of ink on the stamp compared to the size of the basketball; so the little dot on the stamp, the amount of ink on the stamp, the

> small amount of ink on a stamp is being compared to how many people live on the planet--basketball kind of thing compared to this.

His desire to understand this passage is evident in sentence 4:

> I reread almost every sentence, almost all of them to just understand them better. When I thought of a green layer of scum I was thinking of algae. And "a small rock whirling through space," I knew they were talking about earth, but I was picturing just a rock spinning around real quick through space.

Although he still relied primarily on Knowledge and Comprehension moves, he used a greater proportion of moves that went beyond mere paraphrasing or summarizing to include interpretation of meaning or he combined paraphrasing with other kinds of moves. For example, in response to sentence 13:

> The elements, the animals, they call them the elements, plants and animals live in a cycle, taking in air, breathing and eating and that's known as living. That's what they call living.

The active stance with which he approached the "Biosphere" passage is further evident in sentences 11 and 16, where he used Monitoring moves which challenged information in the passage:

> So, eight kilometers high is the highest and eight kilometers down is the lowest that animals can live, but I didn't think that oceans were really that deep. I thought they were only a mile deep or a couple of miles.

> OK, I seem to object to this too because they say a meteor enters the earth. They say little matter is different than it was before. Isn't it made of different things other than what's on the earth. I thought it would have been.

Despite his active approach which demonstrated no negativism, only partial understanding of parts of the passage is evident in his summary of it. He may have known more but instead chose to focus on only the following information in the summary:

> It's basically saying that matter can't be created nor destroyed. Everything is staying right here where it is on the earth. Everything changes its state, like minerals from the ground and the light from the sun could form into an animal or a plant. Then it dies and just returns back to the earth again. So it's all the same. We're just living right here on this planet. That's all, no help from outside.

In summary, Walt is a reader who has the capacity to engage in active reading with success and does so when his interest is aroused. Perhaps the figurative style in which the "Biosphere" passage was written contributed to his enjoyment and active involvement with the passage. This appears to be an example of material which "fits" the reader's comprehension style. On the other hand, when he finds the material uninteresting and takes a passive approach, as he did with the "Social Institutions" passage, his understanding is not as good. His active reading of the "Biosphere" passage evidences his successful approach, his mechanical reading of the "Social Institutions" demonstrates his least successful behavior, and his active reading at the beginning of the "Waugh" passage which turned abruptly to a passive approach midway through the passage demonstrates a curious combination of both approaches. Perhaps that

occurrence exemplifies the kind of difficulty in understanding literature that Walt had referred to in his interview when he said he found literature to be the most difficult reading because the authors do not, according to him, "use a regular straightforward form of writing."

Jim

At the time of the study Jim was a 17 year old university freshman majoring in elementary education. His SAT verbal score was 300 and his SAT math score was 420. Classified as a field independent difference poor reader, he had a GEFT score of 16 and his Nelson Denny Reading Test Scores were: Vocabulary 14.7, Comprehension 8.7, and Total 12.9. Jim produced 144 moves for the three passages read. The average number of moves made by the field independent subjects was 99.3 and by poor readers was 84.1. Therefore, compared to other subjects in his groups he verbalized a great deal more.

Jim's pattern of moves is described in Table 28. Both raw and proportional numbers are indicated.

The largest proportion of Jim's moves, 37% were in the Construction superordinate category; Elaborating, a subcategory of construction, accounted for 28% of the total moves he made. Jim's patterns of moves were very inconsistent. For example, he used Construction moves most often in "Waugh" and "Biosphere," but employed Knowledge and

Table 28

Pattern of Moves of Jim

	Waugh Raw	Waugh Prop	Soc. Instit. Raw	Soc. Instit. Prop	Biosphere Raw	Biosphere Prop	Total Raw	Total Prop
Comprehension Monitoring	**10**	**23**	**13**	**24**	**3**	**6**	**26**	**18**
Monitoring	10	23	9	17	2	4	21	15
Implementing	0	0	4	7	1	2	5	3
Construction	**19**	**44**	**13**	**24**	**20**	**43**	**52**	**36**
Elaborating	10	23	12	22	19	40	41	28
Reasoning	9	21	1	2	1	2	11	8
Knowledge and Comprehension	**10**	**23**	**18**	**33**	**8**	**17**	**36**	**25**
Signaling	8	19	16	30	4	9	28	19
Demonstrating	2	4	2	4	4	9	8	6
Critical Thinking	**1**	**5**	**4**	**7**	**7**	**15**	**12**	**8**
Analyzing	1	2	2	4	6	13	9	6
Judging	0	0	2	4	1	2	3	2
Personal Response	**3**	**7**	**6**	**11**	**9**	**19**	**18**	**13**
Raw Total	43		54		47		144	

Comprehension moves most often in "Social Institutions." In addition, he carefully monitored comprehension in "Waugh" and "Social Institutions" but not in "Biosphere."

Jim has mixed feelings about himself as a reader. On one hand he says he has poor concentration, has trouble comprehending what he reads and reads too slowly; on the other hand he contradicts himself by saying that he feels he can read at the college level. He believes that if he were to read more, both his vocabulary and writing would improve.

The only thing he remembers about his early reading experience is that his mother made him read billboards as they rode in the automobile; he says he enjoyed doing that. He also remembers that as a child he sat with his father as his father read magazines to him. He doesn't remember having any literature available in the home.

Jim does not recall having read books in high school but says that he "squeaked by" without having to do so. The exception to this pattern was his reading of some of Mark Twain's works in preparation for a report he wrote. He liked those stories because he thought it would have been fun to live the kind of lives Twain's characters led.

The only reading material Jim really enjoys now are articles that contain practical information on how to do things. He is an outdoorsman who likes topics such as hunting and fishing.

Jim feels that the thinking-out-loud procedure used in

gathering data gave an accurate reflection of his reading. He says that when he reads he forms mental pictures exactly as he did in the recorded sessions.

As indicated in the interview, Jim does frequently use imagery when he reads. His 24 instances of this move was the highest of any of the 16 subjects. In the "Waugh" passage, his use of that move is exemplified in sentence 2:

> I just pictured this big old man in a chair with an old dirty T-shirt and newspaper and probably usually drunk and just sleeping, watching sports and the news and stuff and then going to bed later, just a stereotype, you know, kind of fat.

His use of reasoning moves in the "Waugh" passage was the highest among the eight field independent subjects. For example, he exhibited reasoning in sentence 4 where he formulated a hypothesis:

> That's weird. His "last love died." Maybe it was his wife or something that just died or somebody in whatever it is. It's his wife or girlfriend just died in the same place he was. Maybe not in the same room.

After reading sentence 5 he used the new information to revise the reasoning move he had made in the previous sentence:

> Well, the last love could have been instead of a girl, it seems now that maybe it was a hobby or maybe even a dog 'cause he said "its." Maybe it was something that wasn't alive.

Jim was very attuned to the state of his comprehension throughout the passage as evidenced in sentence 12:

> Now I don't know if he's still talking about. . . I don't understand this too well; but he's either

> talking about this girl that I thought he had lost a long time ago or he's still symbolizing the army in this girl, his wife.

His summary reflected his ongoing inability to clarify the meaning of the passage. Also there was indication that he may have forgotten the reasoning he had used in regard to sentence 5:

> Like I said before, I couldn't tell what he was talking about. In the beginning I pictured this man that was getting kind of old, getting sick with his life, you know. He's a middle-age type crisis. And then he started talking about being in the army and how sick of that he was. But then he started talking about a woman. I couldn't remember if he said something, but he was either symbolizing with a woman, using a woman as if he was sick of that or it he was actually talking about a woman that died. But his love for the woman or love for the army died somewhere along the line.

In the "Social Institutions" passage, Jim experienced great difficulty with the first four sentences as evidenced in his thoughts regarding sentence 1:

> Social groups of people . . . I'm thinking groups of people like friends are confused with social institutions which are maybe a place or a dance or something. When I think of an institution I think of something like a college. I don't think of a social college. It doesn't make sense to me.

When he used imagery in sentence 5 he began to form an approximation of the meaning of the passage:

> Oh, now I understand what it's trying to say. It's saying that the, hmm. I'm thinking of a cross and stuff. Religion is like the big body of water and the Baptist Church would be like a smaller part. The religion is the big part, like the big subject and then the Baptist Church would be like a smaller part. I'm visualizing a big part and a smaller one.

In sentence 6 he struggled with his lack of understanding of which he was obviously very aware:

> I'm thinking about religion and the Baptist Church and education and a certain place of education, the confusion between institutions and organizations. That's the difference. I don't know what "entity" means. I'm trying to think what that means; but from what I know an entity is a ghost, so I don't understand that one.

In sentence 7 he used an Implementing move but was unsuccessful. His attempt to use prior knowledge to help him understand the meaning of the word "abstract" also failed:

> When they say "abstract" I think of art, so that sort of gives me an idea of what that means. Then it gives an example: a "family" is it says an "institution." I think of my own family. When I read that, I went back up to number 4 and 5 and again and tried to figure out what an institution is again.

In sentence 8 he continued elaborating on the text:

> When I read that I thought of the way my parents' families were and how strict they were and then families today, how kind of loose they are, not loose, but the United States was more family oriented back then.

Despite that effort, his statements after sentence 9 revealed that he still could not differentiate between the two senses in which the word "family" is used:

> Like I said before, when I see the word "family" I think of my own family. Then to refer to an actual group of people, that's kind of like a broad thing to say. I mean I don't understand what they're getting at. They stop it there and all you're thinking about is the next sentence, trying to figure out what it could be. So now, however, I'm going down to the next one.

His lack of understanding was confirmed in sentence 13, where it became evident that he did understand what an organization is, but he still was struggling with the concept of the word "institution" as an abstraction.

> When I hear the word "institution," I think of a big strong building. Whenever I hear the word "abstraction" I think of art, so that doesn't make much sense right now, unless I think about it. I don't understand how they can call "institution" an abstraction," but I can understand that "organization" is an existing group.

His summary of the passage further confirmed his lack of clear understanding of the concepts defined in the passage:

> To sum it all up is kind of hard because first of all I wasn't concentrating too hard on the first part. I think he's talking about an institution and an organization and the differences there are and I do remember learning about that in sociology in high school last year. But it's talking about an institution and an organization. I think they are two opposites. That's what it is talking about.

In the "Biosphere" passage, Jim began his reading successfully by engaging in the suggested imagery while at the same time expressing uncertainty as to the point of it:

> Well, I just picture a basketball with a stamp on it. It doesn't make much sense.
>
> Now I see the little stamp, on the side, and I'm trying to look how thin the ink is but there's no way you can ever tell.

But by sentence 5 he got bogged down in imagery at the expense of focusing on the point being made (that life's sustenance is found in the layer of earth known as the biosphere):

> I think of earth dwellers, plants, animals; but then I think that the thin part of the planet that we live on is the biosphere. Then I go back thinking about the ink again and that's the layer of ink that is the biosphere.

In sentence 6 he expressed confidence that he handled the task automatically:

> I really didn't think that much about that one. It just was thrown into my head.

Again, imagery was used in sentence 7:

> I pictured just a map and the small parts of water that are on the map, like the oceans and lakes.

The lack of processing he had revealed in sentence 6 had been detrimental to his comprehension, as seen by his response to sentence 8; it reveals that he had indeed missed the point that had been made in sentence 6:

> That's weird. When he talks about the water, when he talks about the third portion I was waiting for it to say about the land. It said something about the atmosphere, which didn't make much sense to me. So I'll read the next one and see if it makes any sense.

In the next sentence he continued to use imagery:

> I just took it step by step and pictured the biosphere as a small portion where people live. "Sandwiched," I just pictured it stuck together with the geosphere, the hard part of the earth, the atmosphere, I just picture up in the sky. And then I picture the earth spinning around.

His reliance on previous knowledge and imagery in sentence 15 impeded him from focusing on the term "closed system" which was being emphasized.

> I remember back when I was in elementary school, I remember that cycle. There was a big "ecosystem," I think it's called, in elementary school in

> science. I just remember this picture that had arrows going around and it showed how things went through their life cycle.

The comprehension problem which surfaced in sentence 15 continued and became greater in sentence 17:

> I thought about that little system that I had in elementary school. I pictured that again, but it doesn't work as well as it did with the other sentence. I really don't understand this sentence too much.

His summary reflects reliance on prior knowledge and only vague global understanding of the passage:

> It was just telling about the earth's system, the ecosystem. That's what we called it in elementary school. He used figurative language to make it kind of funny, but it just tells about how the earth works.

The major problems he had with this passage were an over reliance on both previous knowledge and imagery which resulted in his being oblivious to information which was possibly new to him.

In summary, Jim exhibits a comprehensive style characterized by a high level of enthusiasm and involvement. He frequently engages in imagery; sometimes this contributes to his understanding, while other times it is detrimental because the mental pictures he creates do not include key elements of the context.

He frequently uses Construction moves, often in the form of reference to prior knowledge. But as with the imagery, his use of prior knowledge does not always help him understand the current information. In fact, he may over

rely on imagery and prior knowledge in some cases.

He has a keen awareness of vocabulary and its role in his comprehension. He frequently pointed out words whose meanings he knew in different contexts. Sometimes he tried to carry the meaning over to the new context; other times he conceded that he did not know what the word meant in the specific way it was used in the passage. His monitoring of word meanings typifies his tendency to monitor his understanding. In the "Waugh" and "Social Institution" passages he used frequent monitoring moves. Only in the "Biosphere" passage, where he relied on imagery for 40% of his moves, did he seem to lack awareness of comprehension problems. By the same token, this was also the passage where Knowledge and Comprehension moves accounted for only 17% of his protocols. This seems to provide further evidence that he sometimes overuses imagery to the point of losing sight of the meaning in what he reads.

Ron

Ron was a 17 year old university freshman majoring in criminal justice when he participated in the study. His verbal SAT score was 390 and his math SAT score was 280. Identified as a field dependent good reader, Ron's GEFT score was 2 and his Nelson Denny Reading Test grade level scores were Vocabulary 12.9, Comprehension 14.4, Total 13.6.

He produced 90 moves for the three passages. The

average number produced by the eight field dependent readers was 71.8 and the average produced by the eight good readers was 86.9. Therefore, he was slightly more verbal than most other field dependent subjects.

Ron's pattern of moves is described in Table 29. Both raw and proportional numbers are indicated.

Ron is a very flexible reader. Knowledge and Comprehension moves were those used most often in the "Waugh" passage, but Critical Thinking moves, especially analyzing, were those most often employed on "Social Institutions" and "Biosphere."

Ron feels confident about his reading ability. He remembers having learned to read using the Initial Teaching Alphabet (ITA) approach. He did not particularly enjoy reading throughout his elementary and high school years, but instead he found much reading "boring and uninteresting." The one book from elementary school that is prominent in his mind is The Outsiders which he remembers having read in fourth grade. He especially enjoyed that book because it was "mostly about kids, different types of kids." He attributes his general lack of interest in reading during high school to "immaturity" and "wanting to do other things."

Table 29

Pattern of Moves of Ron

	Waugh Raw	Waugh Prop	Soc. Instit. Raw	Soc. Instit. Prop	Biosphere Raw	Biosphere Prop	Total Raw	Total Prop
Comprehension Monitoring	**8**	**27**	**0**	**0**	**2**	**6**	**10**	**11**
Monitoring	8	27	0	0	1	3	9	10
Implementing	0	0	0	0	1	3	1	1
Construction	**9**	**30**	**3**	**12**	**11**	**32**	**23**	**26**
Elaborating	3	10	3	12	5	15	11	12
Reasoning	6	20	0	0	6	18	12	13
Knowledge and Comprehension	**10**	**33**	**9**	**35**	**6**	**18**	**25**	**28**
Signaling	9	30	8	31	5	15	22	24
Demonstrating	1	3	1	4	1	3	3	3
Critical Thinking	**2**	**7**	**10**	**38**	**14**	**41**	**26**	**29**
Analyzing	2	7	9	35	14	41	25	28
Judging	0	0	1	4	0	0	1	1
Personal Response	1	3	4	15	1	3	6	7
Raw Total	30		26		34		90	

He has always been physically active, participating in several organized sports. Therefore, while growing up, one of the few topics he did enjoy reading about was sports. He attributes much of his reading ability to the use of the newspaper to follow sporting events. Later he moved to other sections of the newspaper, especially to articles having to do with foreign affairs and criminal justice.

Eventually he began to develop some enjoyment for literature which he associates with his father's being an English teacher. He recalls Dracula as a book he liked during his senior year and talks enthusiastically about a literature course he is taking. As a college freshman he sees his reading habits changing greatly and reports taking increasing interest in reading and using the library. He finds science material to be the most difficult.

Ron sees himself as being able to write fairly well and is proud of having won two consecutive annual awards at the state level for sports articles he had written for his school newspaper.

He thought the thinking-out-loud process interfered with his comprehension because he usually reads several sentences before stopping to see how they fit together.

Ron used an active approach in reading the "Waugh" passage. He carefully monitored his comprehension from the beginning, as in sentence 2:

> I don't really understand number 2. It's just stating that a person reads the newspapers and, I don't really know. I can't really tell right now.

He also tried to see the relationship between ideas:

> I'm still confused here. I don't know what significance this has with the first one.

As he progressed through the passage he used reasoning in an attempt to build meaning:

> Again I don't know what is going on. "Here is my last love died." I don't know. Maybe he's just talking about his past and being remorseful.

But then he was unable to use the word <u>it</u> in sentence 5 to refine the hypothesis. Instead he focused on the more salient word <u>death</u>.

> I'm just wondering how this ties in right now with the other four, and I really don't know. It's talking about death.

When confronted with sentence 9 he was aware that an analogy was being made but he misinterpreted it:

> Number nine's, I guess, I'm pretty confused with this, but he's saying how he might feel like a wife to some of these people under him. I don't really catch on to this.

He did not use the information in sentence 10 to correct the misconception he had made in sentence 9. Instead he again relied on a global perception:

> He's talking now about how he related the military.

Once he was unable to fully understand the analogy his understanding deteriorated even more:

> Number 11 appears like he's getting more hard, not as tender and loving. His love's leaving him. He's getting more hard.

> Hmmm. Right now I think I'm confused here because this is like totally opposite from number 11 and I don't know what to expect here.

This lack of clarity in interpretation persisted until the end of the passage and is reflected in Ron's summary of it:

> This is a passage about a man who was in the army and got out of the army because he was getting too hard and all that. I guess he found a woman because he started to love her, but he started doubting himself and comparing her to the army and military life.

In summary, Ron's comprehension problem with the passage seemed to reflect an inability to structure an inductively developed passage. Secondly, he assumed a passive stance in which he was aware of his lack of understanding but did little to correct it. Furthermore, he failed to use subtle yet relevant clues that could have helped him better understand the passage.

On the "Social Institutions" passage Ron seemed to feel no discomfort with his understanding. In contrast to the "Waugh" passage where he was unaware of his comprehension problem, he evidenced no comprehension monitoring in this passage. Instead he focused on analysis of the structure of the passage as evidence by statements such as this is reference to sentence 3:

> They're talking about the differences between groups and organizations right now, or, between institutions and groups and organizations.

Often he combined paraphrasing of a single sentence

with analysis of the structure. Sometimes this resulted in vague generalizations that did not provide clear evidence of his understanding, as in sentence 4:

> They're just saying how education is an institution and a specific college is an organization. They're just showing a difference there.

Several times he made statements which indicated a negative personal response to the content. For example:

> Again it's just showing <u>family</u> as a way to refer to an institution. Right now I'm thinking this is pretty dumb.
>
> Right now I'm wondering why they are stating all this. They keep on giving examples.
>
> They're stating here that "The word <u>institution</u> is an abstraction and the word <u>organization</u> refers to an existing group," and I think they could have cut out a whole bunch of stuff there and just put that up earlier. That is what I'm thinking, instead of prolonging this passage.

His summary of the passage was, like his reading of it, focused on analyzing the structure of the passage rather than on analyzing the ideas presented or on demonstration of any definite comprehension. Therefore it was impossible to tell for certain whether he understood the content:

> They're talking about institutions and groups and how they are similar in some ways but they are unalike. They are not totally similar. They have differences. That basically is what it was about.

In approaching the "Biosphere" passage, Ron responded personally to the first sentence:

> I'm mad right now because I'm thinking of a basketball with a postage stamp glued to it. I used to play basketball so it seems like they're

putting down basketball.

He took a role whereby he observed the function of the sentence without giving any indication that he was using the visualization technique suggested in the text:

> They're just saying, trying to get you to think about something, think about how the thin ink . . . wait . . . "Picture next how thin the ink on the stamp is." Oh, they're trying to get you to visualize something, I guess.

Yet he was able to see the relationship between sentences 6 and 7:

> It's more or less talking about how the world is. In number 6 they're talking about the land. Now they're talking about the water in number 7.

He was also able to summarize the content of sentences 6-8 after reading sentence 8:

> OK, they divided it up into three parts; one being land, two being water, and three being the atmosphere.

Ron interpreted sentence 13 as being the focal point of the passage:

> Number 13 is like, everything else leads up to number 13, saying how we live, how we get the process called living.

He maintained concentration on the topic of the life cycle which continued in sentence 14:

> They're stating how when you die your matter returns to the earth there and starts the whole cycle all over again.

Then when sentence 15 moved the focus from discussion of the life cycle to the concept that earth forms a closed

system, he did not make the transition but instead perseverated in emphasizing the life cycle:

> It's talking about earth's system and saying anything will affect something, anything. If something dies, that will help the process for the next generation or continue life.

Because the concept in sentence 15 was not attended to, the relationship of sentence 16 and 17 to sentence 15 was not clearly drawn and the contrast between the energy system and the matter system was missed:

> I'm confused. They're talking about meteorites. I guess they're going to tie this in with the life force. I don't know.
>
> They're talking about energy right now in number 17. Right now I'm looking to see what number 18 is going to tell me.
>
> Again they're just talking about the biosphere again. It's saying we need energy to live.

In summarizing the paragraph, Ron provided a vague random listing of some ideas from the passage, but much of the content had been lost. He also emphasized the idea tangential to the "process called living" which he had seen as a focal point of the passage during his reading but he failed to structure the relationship of the ideas:

> They were just talking about every single matter has some kind of significance and they use a lot of comparisons in this. I guess they think a stamp on a basketball could be, could compare to like a country in the world, like different aspects. Then it talks about if you die your matter will continue the cycle, the process of living. Basically they're talking about needing energy to live, kind of stating that. That was a pretty tough one.

In looking at Ron's reading of these three passages as a whole, it becomes evident that although he was classified as a good reader, he had difficulty with all three passages. Perhaps the thinking-out-loud process, which he found awkward, interfered with his comprehension. His problems with the passages varied in nature, depending on the kind of material he was reading. On the "Social Institutions" passages, the problem was caused by his taking a passive spectator approach to the passage; he used no Comprehension Monitoring or Reasoning in reading the entire passage. Instead he focused on analyzing the function of individual sentences and paraphrasing content sentence by sentence. In the case of the "Waugh" text it was an inability to fully comprehend an extended analogy that caused the difficulty, but he did use Comprehension Monitoring and Reasoning extensively. On the "Biosphere" passage his problem seemed to be caused by his inability to benefit from the visualization directions and also from his placing undue emphasis on one part of the text, "the process called living," instead of focusing equally on all important information.

The role of attitude in reading comprehension is clearly observed in the case of Ron. His active way of reading the literary "Waugh" passage probably exemplified the enjoyment of literature that he talked about in the interview. On the other hand, his comments that expressed

criticism of the way ideas were presented in the "Social Institutions" showed an intolerance for the author's style that seemed to have adverse effects on his understanding of the material.

Jeanine

At the time of the study Jeanine was an 18 year old university freshman who had not declared a major. Her Verbal SAT score was 300 and her Math SAT score was 260. Identified as a field dependent difference poor reader, Jeanine's GEFT score was 0 and her Nelson Denny Reading Test grade level scores were: Vocabulary 11.7, Comprehension 7.5, and Total 9.5.

Jeanine produced 59 moves for the three passages. The average number produced by the field dependent subjects was 71.8 moves; for the difference poor readers it was 84.1 moves. Therefore, she was relatively reticent in her verbalizations.

Jeanine's pattern of moves is shown in Table 30. Both raw and proportional numbers are presented.

She used a consistently high percentage of Knowledge and Comprehension moves; the percentage of her total moves in Knowledge and Comprehension varied from 62% on the "Biosphere" passage to 84% on the "Waugh" passage. Otherwise, she showed some flexibility in her patterns of moves.

Table 30

Pattern of Moves of Jeanine

	Waugh Raw	Waugh Prop	Soc. Instit. Raw	Soc. Instit. Prop	Biosphere Raw	Biosphere Prop	Total Raw	Total Prop
Comprehension Monitoring	**1**	**5**	**0**	**0**	**5**	**24**	**6**	**10**
Monitoring	1	5	0	0	4	24	5	8
Implementing	0	0	0	0	1	5	1	2
Construction	**2**	**11**	**1**	**5**	**0**	**0**	**3**	**5**
Elaborating	0	0	1	5	0	0	1	2
Reasoning	2	11	0	0	0	0	0	3
Knowledge and Comprehension	**16**	**84**	**13**	**68**	**13**	**62**	**42**	**71**
Signaling	13	68	11	58	13	62	37	63
Demonstrating	3	16	2	11	0	0	5	8
Critical Thinking	**0**	**0**	**4**	**21**	**1**	**5**	**5**	**8**
Analyzing	0	0	4	21	1	5	5	8
Judging	0	0	0	0	0	0	0	0
Personal Response	**0**	**6**	**1**	**5**	**2**	**10**	**3**	**5**
Raw Total	19		19		21		59	

Jeanine remembers being read to by her mother but does not remember much about her earliest experiences in actually learning to read except that she made attempts to read the newspaper at an early age. As a child, she enjoyed reading books typically read by girls; in junior high school she liked to recount to others the short stories she had read. At that age she also especially liked mystery novels and teenage magazines.

Jeanine sees herself as able to comprehend what she reads if she stops to think about it. When asked to discuss the thinking-out-loud process whereby the data had been gathered, she stated that reading sentence by sentence and thinking aloud had actually helped her "get a clearer picture" of what she was reading.

She admits that she would probably be more successful in college if she would take the time to read those assignments which often go unread. She finds science texts the most difficult and says that she must read them much more slowly than other textbooks. Although she enjoys reading novels, she says she never gets around to reading for pleasure. She sees herself as more competent as a reader than as a writer, but feels that by reading more both for pleasure and for academic courses she would become a better writer and generally a more successful student.

Despite the fact that for the "Waugh" passage she had the highest proportion of Knowledge and Comprehension moves

of all 16 subjects, she had no difficulty in comprehending the passage. When faced with ambiguous sentences 4 and 5, she evidently noted and accepted the ambiguity:

> They're saying that something or someone that they loved had died.
> It's saying that whatever died, it died in a common way. There's nothing out of the ordinary that happened to them that caused their death.

Then when sentence 9 later provided more information related to and clarifying the meaning of sentence 4, she got right to the main point being made, seemingly untroubled by the analogy. Curiously, she never alluded to the analogy in any of her protocols:

> He's saying that he really doesn't care about his work anymore and he's questioning why he wanted to be there, why he ever chose to be there and I guess he wants a way out.

Her summary also reflected her clear matter-of-fact interpretation of the situation described in the passage:

> It's a man that's in the army. He's been in the army for three and a half years, and when he first went into the army he thought it would be exciting. He thought it would be an adventure, but after his three and a half years of staying there he realized that the army wasn't really all he expected it would be. Now he wants to find a way to get out.

Jeanine's comprehension of the "Social Institutions" passage was not as good as her understanding of the "Waugh" passage but better than that of the "Biosphere" passage. She seemed to understand the conceptual distinction exemplified in sentence 4 and 5:

> It's saying that an example of an institution is education, which is an institution, and the people

in the institution are an organization.

> Again, it's giving another example, religion being an institution and the people in the religion or in the church are an organization.

Then in sentence 6 her level of comprehension was dubious, as evidenced by what she said:

> It's saying how people can get organizations and institutions mixed up and where the organizations come from and where institutions come from, like the differences between them.

Her understanding of sentence 8 was even less obvious:

> It's saying that another way to describe the word family is a group of people, like referring to an actual group of people.

Her summary of the passage revealed that she had understood at least the gist of the passage but she was not able to clearly distinguish between concepts through an example.

> It's describing an institution and an organization, how an institution is like the whole community or the whole building and the organization are the people that are in the institution. It's also describing families and how the word family is . . . how can I say it? Family has similar but different meanings.

In contrast to her apparent ease in understanding the "Waugh" passage was Jeanine's difficulty with the "Biosphere" paragraph. She made only 21 moves in reading that passage which contained 18 sentences; thirteen of those moves were restatements or paraphrases of the individual sentences. Although she made four Monitoring moves, she made no attempts to construct meaning by using Reasoning or

Elaborating moves. In fact, she did not accept the invitation to use imagery given in sentences 1-3 but instead made Comprehension Monitoring moves:

> I guess I really don't know what sentence number 1 is saying as of yet. I guess as I read I'll get a clearer picture.
>
> I still don't understand.
>
> Still I have to read on.

Her interpretation of sentence 4 was reminiscent of her interpretation of the "Waugh" passage in that she totally omitted any figurative language or imaginative ideas from her protocol but rather paraphrased the idea of the sentence directly and concretely:

> It's saying that we, the people that are living on the Earth, we're just like a small group on the planet Earth that's rotating through space.

Sentences 6, 7, and 8 list the three parts of the biosphere. Jeanine seemed to have no difficulty with 6 ("Part of the biosphere is solid land.") and 7 ("Part of it is water, including all the world's oceans."), but sentence 8 with similar information ("Its third portion is a part of the atmosphere.") caused her a problem for which she took no action:

> It's saying that the biosphere is solid land. There's really no way to explain it.
>
> Part of the biosphere is made up of water, and that includes the seas and the oceans, the rivers and the oceans.
>
> I don't understand 8.

In sentence 9 she failed to use the contextual clue to

understand the figurative language:

> It's saying that the biosphere, the geosphere, is pressed between, it's like layered between the biosphere and the "gaseous envelope," whatever that is, spins in space.

Because she became confused by the sentence's construction, she had difficulty with sentence 15 which states, "Earth's matter thus forms, for all practical purposes, a closed system: it is a system because a change in any part will affect all other parts: it is closed because elements outside the system do not affect it significantly."

> It's saying that the matter is formed for "practical purposes" and a change in any part of matter will affect the matter surrounding it.

Her summary revealed that she was aware of comprehension problems she had experienced in reading the passage. Only one piece of major information was addressed in her summary:

> It was a really hard paragraph. I really didn't understand it too well. All I really remember about it is that we're all created of matter and that when we die the matter goes back in the soil, or in the earth, and is reprocessed into different forms.

In summary, Jeanine appears to be a passive reader who relies almost exclusively on paraphrasing to comprehend. When the paraphrasing is incorrect she becomes lost. Furthermore, she screens out all but the concrete information so that imagery and figurative language are not used by her in creation of meaning. Likewise, her use of

Critical Thinking moves appears to be minimal: she used no Judging moves in any of the three passages and made only four Analyzing moves. Three of those four moves were indications of her awareness that examples were being given.

Perhaps Jeanine's difficulty with the "Biosphere" passage reflects her self-assessment as someone who is not good with science. Her relative success with the other two passages, especially "Waugh," may also be an evidence that, as she indicated in the interview, the thinking aloud procedure did indeed help her comprehend more successfully than would have been expected.

Summary of Case Studies

None of these four developmental students expressed much enthusiasm for reading. While all gave indication that for them reading is a low priority activity, each was able to identify one author, book, or topic that he or she has at some point enjoyed. All expressed a sense of qualified self confidence as readers. Statements indicating that the subjects can read well if the topic is of interest, if the reader concentrates, or if the reader thinks about what is being read were characteristic of all four subjects. Ron, the field dependent good reader, expressed the greatest confidence in his reading, both during the actual reading of the passages and in the reading autobiography and interview. He also was the one who spoke most positively and concretely

about the current role of reading in his life.

The two good readers differed in their perceptions of reading of literature. Ron, the field dependent subject, said he finds literature easy; but Walt, the field independent reader, expressed the feeling that for him literature is difficult. Conversely, whereas Walt liked the science passage, Ron said that he found the passage difficult.

Both good readers expressed a sense of competency as writers. On the other hand, neither difference poor reader seemed to feel as though he wrote well; instead they both said that if they would read more they would become better writers.

When asked about their feelings regarding the thinking-out-loud process, both difference poor readers were positive in their responses. Joe said he usually reads and visualizes as he frequently did in the study, and Jeanine commented that she felt that the thinking-out-loud process had actually helped her concentration. This may be related to her statement indicating that she can read successfully if she thinks about what she is reading. Both good readers were less enthusiastic about the TOL process. Walt felt that it was only slightly related to the way he usually reads, while Ron thought that verbalizing after each sentence had interfered with his reading success.

Like the other subjects in the study, these four

readers varied in the proportions and consistency of pattern of moves made across the three passages. The two good readers, Walt and Ron, happened to use relative consistent patterns of moves, although no such trend had actually been found among the good readers. Both Walt and Jeanine always used Knowledge and Comprehension as their most frequently used moves. Joe was the most flexible of these four subjects in the relative proportions of moves used in the three passages.

In regard to the relationship of cognitive style and reading proficiency to comprehension style, these four subjects in many ways typified the groups they represented. Both field independent readers, Walt and Jim, used imagery when reading "Biosphere," while neither Ron nor Jeanine, the field dependent readers, employed the imagery as directed to do. Both field dependent readers made statements about science in general and the "Biosphere" passage itself which reflected perceptions that for them science is difficult. While the field independent readers, Walt and Jim, were not more successful in understanding the "Biosphere" passage, both expressed no sense of doubt or negativism about either the reading of science or the passage itself.

While some of these four subjects' responses to specific aspects were typical of their group, on the "Social Institutions" passage this was not so. Walt, a good reader, in the manner typical of the good readers attempted to

differentiate between the concepts presented; but Ron, the other good reader, did not try to explain the difference. Furthermore, Jeanine, the field dependent difference poor reader, was among the most successful subjects in summarizing the "Social Institutions" passage.

Finally, on the "Waugh" passage, where no relationship between either cognitive style or reading proficiency was found, the four subjects of the case studies displayed a variety of responses and levels of success just as the other subjects also had done.

These four case studies demonstrate that for the most part the way that a reader processes text is highly individualized, but there may be some tendencies to respond to certain elements of text or certain kinds of materials in ways that are related to field dependence or reading proficiency. Furthermore, these case studies demonstrate some of the reading problems that are displayed by developmental students, no matter what their reading proficiency classification may be.

CHAPTER FIVE

SUMMARY, FINDINGS AND CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study

The study was done in order to describe and explore the relationships between reading comprehension skills, cognitive style, and the processes college developmental students employ when they read materials typically found in college developmental reading texts. Underlying the study's purpose was the concept that as college admission becomes less selective, it becomes more necessary to understand how students think so that we can know how best to help them. It is hoped that this research will contribute to the knowledge of how to assess students' reading strengths and diagnose their weaknesses and will ultimately help in the development of better ways of assisting developmental students to achieve reading skills at the level necessary for college and career success.

The study sought answers to question at three levels: (1) the population and groups, (2) the subgroups, and (3) the individual readers.

All students in the developmental program at Kutztown University were given the Nelson Denny Reading Test (NDRT), Form C, and the Group Embedded Figures Test (GEFT). The

scores from these tests were correlated to determine the relationship of vocabulary and comprehension proficiency to field dependence for that population.

Sixteen subjects were chosen from the population on the basis of their scores on the NDRT and GEFT. These subjects were trained in the thinking-out-loud procedure. They then read three experimental passages. After each sentence of each passage they verbalized their thoughts. This data was tape recorded, transcribed, and analyzed according to a classification system adapted from that developed by Lytle (1982). After interrater reliability was satisfactorily established, comparisons were made between the field independent and field dependent readers and between the good readers and the difference poor readers in order to determine (1) whether these groups differed in the number of verbal responses, or "moves," they produced while reading and (2) whether these groups exhibited consistent patterns of categories of moves while reading different materials.

The next level of analysis included the verbal protocols of four subgroups: (1) the field independent good readers, (2) the field independent difference poor readers, (3) the field dependent good readers, and (4) the field dependent difference poor readers. These subgroups were compared as to both the relative number of moves they produced and their relative proportions of moves in various categories.

In the last part of the study, the individual subjects' moves were analyzed to determine (1) whether individual readers displayed consistent characteristic patterns and (2) how individual readers responded to specific features of the texts they had read. Four subjects, one from each of the subgroups, were also chosen for more extensive case studies. The case studies were based on these subjects' protocols, reading autobiographies, loosely structured interviews, and departmental records. The case studies presented information from those sources and focused specific attention on the two questions that had been asked in regard to all the individual subjects: (1) Do individual readers employ characteristic patterns of moves which might be considered comprehension styles? and (2) How do reading proficiency and cognitive style relate to comprehension style?

Findings and Conclusions

This study represents the beginning of an exploration of the role of field dependence in the reading process as understood through protocol analysis. The research was broad in scope; therefore, the conclusions reached can be seen as providing only preliminary indicators that may lead to additional research designed with more specific purposes and more narrow tasks.

The following conclusions have been drawn from the study:

1. Little relationship was found between field dependence and standardized reading test scores for this population of developmental college students. This is in contrast to much other research which has found that on specific reading tasks field independent readers tend to perform generally better than those who are field dependent (Adejumo, 1983; Lefever & Ehri, 1976; Provost, 1981; Smith & Stendal, 1981).
2. When engaged in the thinking-out-loud reading process, the group of readers who were field independent tended to produce more moves on the three passages combined than did the group who were field dependent, but the difference was not statistically significant. On the other hand, the group of good readers and the group of difference poor readers produced virtually the same total number of moves. The researcher concluded that articulation of thoughts may be related to field independence. Furthermore, if verbalization of thoughts is equated with active reading, the success of active reading is related to the quality rather than the quantity of the mental activity in which the reader engages.

3. The field independent readers as a group made more moves in certain categories than did the group of field dependent readers, but in some cases the differences were accounted for by the high numbers of moves produced by only one or several subjects in the group rather than by consistently higher numbers produced by most or all of the subjects.

Likewise, when comparing the good reader group to the difference poor reader group, there was one category in which the good readers apparently produced more moves and another in which the difference poor readers did the same, but in both instances just one or two of the total of eight subjects accounted for the seeming group difference. Therefore, it was concluded that while individual readers differed greatly in their use of certain categories of moves, there were no general trends that could be accounted for by either field dependence scores or standardized reading test scores.

4. Field independent readers and difference poor readers, as groups, tended to use similar patterns of moves across the three experimental passages more so than did the field dependent readers or the good readers. Because the difference poor readers displayed the most similar patterns of

moves, it was concluded that they may be the least flexible of the four groups in the use of various reading processes.

5. When comparing the four subgroups--the field independent good readers, the field independent difference poor readers, the field dependent good readers, and the field dependent difference poor readers--some differences were found in the numbers of moves and relative proportional use of various categories of moves, but it was concluded that these apparent differences were reflections of individual differences between the four subjects in each of the subgroups more so that indicators of overall differences characteristic of the subgroups.

6. Some individual readers displayed relatively consistent patterns of moves that could be interpreted as representing one facet of comprehension style, but other individual readers varied from one passage to another in their relative use of the different categories of moves. Furthermore, readers who displayed consistent patterns of moves across passages varied among themselves in the kinds, numbers, and relative proportions of moves they made. Therefore, it was concluded that some readers are more flexible than

others in their approaches to reading various materials.

7. When individual readers' methods of processing and/or responding to specific aspects of the passages were qualitatively analyzed, two differences emerged that were related to field dependence. On the passage with scientific content, reader participation in the visualization suggested in the passage was related to field independence, while the assuming of either a passive or critical observer role was related to being field dependent. On the same passage, field dependence was associated with the production of affective responses in the form of statements expressing confusion or frustration, dislike of the content or style, or negative reaction to the vocabulary used in the passage. Field independence was associated with absence of affective responses. Based on these findings, it was concluded that field independent readers may be able to maintain a more objective focus on meaning, whereas field dependent readers are more subjective in their responses. Furthermore, these findings were interpreted as supportive of the findings of Carrier et al. (1983) that field independent readers are more successful in using

imagery.

8. When individual readers' ways of processing or responding to specific aspects were analyzed, one difference emerged that was related to being a good reader. One experimental passage explained the difference between two sociological terms. Being a good reader was associated with an attempt to differentiate between the terms when summarizing the passage. Being a difference poor reader was associated with failure to attempt to differentiate between the terms but instead to make a more general statement that the terms have different meanings. It was concluded that good readers, both field dependent and field independent, try to make fine distinctions in meaning. This also supports the idea of Brooks et al. (1981) that when verbal ability is controlled, differences between field independent and field dependent readers' success is minimized.

9. The analysis of the ways individual readers process specific aspects of text resulted in finding no differences between the good and poor readers or between the field independent and field dependent readers in three facets of the literary passage read. No differences were found between the groups in their processing of two nonsalient

clue words or in their final understanding of the passage, as reflected in the summaries they produced. It was concluded that other factors besides field dependency or reading proficiency play roles in readers' processing of text.

Recommendations

This is the first study done involving protocol analysis of the verbalized thoughts of developmental college students. Likewise, it is also the first research to use protocol analysis to investigate the relationship of field independent/dependent cognitive styles to the thinking processes used when reading. Therefore, much further research needs to be done in order to develop a deeper understanding of these areas. For this purpose, the following recommendations for further research using protocol analysis are given:

1. Study field dependence and reading proficiency separately. In studying field dependence, control for reading proficiency.
2. Develop a categorization system directly related to field dependence theory.
3. Compare the processes used by two groups of good readers, those who are marginally admitted developmental students and those who have high predicted grade point averages. Such a study

would demonstrate whether there are differences between the ways the two groups process information that go beyond the product centered measurement of standardized tests.

4. Do more extensive study of how readers approach several passages in one academic area or genre. For example, use only science passages or only literature passages in order to gather more information on how readers process one type of material.
5. Study how readers respond to one type of text problem such as garden-path constructions or ambiguities in pronominal reference, by embedding various examples of the problem within extended texts.
6. Do further study of the role of affect in reading comprehension.
7. Study readers' processes in solving critical thinking tasks such as are found on the Watson Glaser Test of Critical Thinking. This test uses a format which includes short passages followed by multiple choice items that test skills such as drawing of inferences, recognition of assumptions, and evaluation of arguments.

The following recommendations are made of facilitating and improving the use of protocol analysis to the study of reading behavior.

1. Establish a minimum frequency standard for including any given category of moves in final analysis and interpretation of data.
2. Make the establishment of interrater reliability a two step procedure whereby segmentation of responses is agreed upon before categorization is begun.

These recommendations are suggested as ways of incorporating thinking-out-loud and/or protocol analysis into the educational process:

1. Use protocol analysis for diagnostic purposes.
2. For students who exhibit poor comprehension as a result of failure to engage in active processing of text, use the thinking-out-loud process as a way of getting these students into the habit of thinking about what they are reading.
3. Use the thinking-out-loud process as a way of teaching students to monitor their comprehension and to respond to any statement of lack of understanding with a strategy to remedy the problem.

4. Explore the idea of using protocol analysis as a tool for combining diagnosis and instruction. In a process analogous to viewing athletic training films, the instructor could analyze audiotapes of the student engaged in the thinking-out-loud process and use the results of that analysis to provide the student with feedback whereby he would be trained in thinking processes.

APPENDIX A

Passage #1--"Waugh"

Passage #1--"Waugh"

1. Here at the age of thirty-nine I began to be old.

2. I felt stiff and weary in the evenings and reluctant to go out of camp; I developed proprietary claims to certain chairs and newspapers; I regularly drank three glasses of gin before dinner, never more or less, and went to bed immediately after the nine o'clock news.

3. I was always awake and fretful an hour before reveille.

4. Here my last love died.

5. There was nothing remarkable in the manner of its death.

6. One day, not long before this last day in camp, as I lay awake before reveille, in the Nissen hut, gazing into the complete blackness, amid the deep breathing and muttering of the four other occupants, turning over in my mind what I had to do that day--had I put in the names of two corporals for the weapon-training courses?

7. Should I again have the largest number of men overstaying their leave in the batch due back that day?

8. Could I trust Hooper to take the candidates class out map-reading?

9. --as I lay in that dark hour, I was aghast to realize that something within me, long sickening, had quietly died, and felt as a husband might feel, who, in the fourth year of his marriage, suddenly knew that he had no longer any desire, or tenderness, or esteem, for a once-beloved wife; no pleasure in her company, no wish to please, no curiosity about anything she might ever do or say or think: no hope of setting things right, no self-reproach for the disaster.

10. I knew it all, the whole drab compass of marital disillusion; we had been through it together, the army and I, from the first importunate courtship until now, when nothing remained to us except the chill bonds of law and duty and custom.

11. I had played every scene in the domestic tragedy, had found the early tiffs become more frequent, the tears less affecting, the reconciliations less sweet, till they engendered a mood of aloofness and cool criticism, and the growing conviction that it was not myself but the loved one who was at fault.

12. I caught the false notes in her voice and learned to listen for them apprehensively; I recognized the blank resentful stare of incomprehension in her eyes, and the selfish, hard set of the corners of her mouth.

13. I learned her, as one must learn a woman one has kept house with, day in, day out, for three and a half years; I learned her slatternly ways, the routine and mechanism of her charm, her jealousy and self-seeking, and her nervous trick with the fingers when she was lying.

14. She was stripped of all enchantment now and I knew her for an uncongenial stranger to whom I had bound myself indissolubly in a moment of folly.

(Excerpted from Evelyn Waugh, Brideshead Revisited, Copyright 1944, 1945 by Evelyn Waugh; copyright renewed 1972, 1973 by Mrs. Laura Waugh. In D. K. Milan (1981) Developing Reading Skills (p. 63). NY: Random House.

APPENDIX B

Passage #2--"Social Institutions"

Passage #2--"Social Institutions"

1. Social institutions are often confused with social groups and social organizations, which are described in the next chapter.

2. They are not the same, however.

3. Like institutions, groups and organizations exist to meet some goals and organizations are deliberately constructed bodies of individuals, whereas institutions are systems of norms.

4. Thus education is an institution; the University of Vermont is an organization.

5. Religion is an institution; the Baptist church is an organization.

6. The confusion between institutions and organizations stems in part from the fact that the names of institutions can often be used to describe concrete entities as well.

7. In its abstract sense, for example, the word "family" is used to refer to an institution.

8. Using the word this way, we might say, "During the 1960s the family in the United States began to undergo important changes."

9. We can also use the word "family" to refer to an actual group of people, however.

10. Using the word in this concrete sense, we might say, "I am going to spend my vacation with my family."

11. The speaker is referring to an existing group of individuals--mother, father, sisters, and brothers.

12. The two meanings of the word are closely related but nevertheless distinct.

13. The word "institution" is an abstraction; the word "organization" refers to an existing group.

(Excerpted from J. R. Eshelman & B. G. Cashion, Sociology, 2nd Ed. Boston: Little, Brown, 1985, p. 98. In K. T. McWhorter (1987) Efficient and Flexible Reading (p. 181) Boston: Little, Brown & Co.

APPENDIX C

Passage #3--"The Biosphere"

Passage #3--"The Biosphere"

1. Think of a basketball with a postage stamp glued to it.

2. Picture next how think the ink on that stamp is.

3. The part of earth occupied by living things is equal to the thickness of the ink on the stamp on the ball, no more.

4. We are, in a sense, creatures who live in a thin layer of a green scum painted on a small rock whirling through space.

5. Everything we earth-dwellers--plants, microbes, fungi, animals--need to sustain life we find within this layer, known as the biosphere, that part of the planet where life is found.

6. Part of the biosphere is solid land.

7. Part of it is water, including all the world's oceans.

8. Its third portion is a part of the atmosphere.

9. Taken together, the biosphere is a thin layer sandwiched between the geosphere, the mass of matter from which the earth is formed, and the atmosphere, the gaseous envelope that surrounds earth as it spins in space.

10. Very uneven both in depth and in density, the biosphere extends upward to at most about 8 kilometers (5 miles) into the atmosphere.

11. Eight kilometers up and 8 kilometers down (only in oceans)--those are the limits between which every form of life on earth exists.

12. Every living thing is a package of matter, made of chemical elements from the geosphere and atmosphere.

13. These elements enter the biosphere and cycle through it in a complex fashion, the process we call living.

14. When a living thing dies, the matter of which it was composed returns to the earth and the air, continuing in the eternal cycle between living and nonliving things.

15. Earth's matter thus forms, for all practical purposes, a closed system: it is a system because a change in any part will affect all other parts; it is closed because elements outside the system do not affect it significantly.

16. Occasionally a few meteorites survive the fiery trip through the atmosphere and land on earth, but little matter enters the system that was not there before.

17. Earth's energy, in contrast to its matter, forms an open system: energy enters from outside the system, from the sun.

18. In fact, if the only energy the earth had were that found within the biosphere, it would soon be exhausted.

(Excerpted from W. M. Laetsch, Plants: Basic Concepts in Botony. Copyright 1979 by Little, Brown. In K. L. McWhorter, (1987) Efficient and Flexible Reading (p. 289). Boston: Little Brown, & Co.)

APPENDIX D

Instructions for Subjects

INSTRUCTIONS FOR SUBJECTS

Adapted from Lytle, 1982, p. 113

I am going to give you a passage to read. It will be typed sentence by sentence on paper with each sentence numbered like this (show short practice passage).

What I want you to do is uncover one sentence at a time. Announce the number. Then read the sentence to yourself silently. After each sentence I want you to talk. Tell me everything you are thinking about and doing as you try to understand that sentence.

I am interested in what you say to yourself as you read, what you are thinking as you go along.

After you have read the first sentence and told everything you are thinking, go on the next one. Announce its number, read it silently, and again tell me what you are thinking about as you are understanding the passage to this point.

If you have trouble understanding, I would like to hear about that too, about what you are doing and thinking as you are trying to understand.

After you have read and talked about the whole passage, I will ask you to turn the sheet over and tell me in your own words as much as you can about the passage and its contents.

APPENDIX E

Types of Moves

Types of Moves

MONITORING of doubts

M1 no understanding or partial understanding
M2 conflicts within text or with reader's knowledge

SIGNALING Understanding

S1 reports understanding or agreement
S2 paraphrase
S3 summary of several sentences

ANALYZING Text Feature

A1 choice or function of word(s)
A2 syntax or length of sentence
A3 sentence or paragraph function
A4 rhetorical or stylistic aspects

ELABORATING the Text

E1 sensory imagery
E2 recall of prior knowledge or lack of knowledge
E3 reference to previous text
E4 construction of arguments
E5 personal response; liking or disliking; laughing

JUDGING the text

J1 ideas
J2 text features

REASONING

R1 hypothesis
R2 prediction
R3 question or search for evidence
R4 explicit use of evidence; conclusion
R5 revision of previous reasoning move

Note: From Exploring Comprehension Style: A Study of Twelfth-grade Readers' Transactions with Text (p. 257) by S. L. Lytle, 1982, Ann Arbor, MI: University Microfilms International. Copyright 1982 by Lytle, Susan Landy. Reprinted by permission.

APPENDIX F

Reading Autobiography

Reading Autobiography

This is an opportunity to focus on one aspect of your life, yourself as a reader. Take time to think about your reading experiences, attitudes, interests and needs. Then write about your past and present life as a reader and about your future goals and needs relating to reading. A guideline is given below to help you:

Early Experiences: (Discuss earliest years through high school)

When did you start to read? What do you remember of your earliest experiences with reading?
What did you read?
Did you enjoy reading?
What have been your reading interests through the years?
Who or what has influenced your attitude towards reading?

Present Experiences:

What kind of reading do you enjoy now?
What kind of reading do you dislike?
When and where do you do most of your reading?
What part does reading play in your academic life ?
How would you describe the way in which you read: your rate, level of understanding, approaches?
How do your reading skills compare to your writing skills? What is the relationship between the two?

Future Goals and Expectations:

What reading skills would you like to improve?
What reading habits would you like to change or develop?
What role do you see reading playing in your future?

APPENDIX G

Characteristic Statements or Questions Provided in Lytle's Classification System

Characteristic Statements or Questions Provided in Lytle's Classification System

(Lytle, 1982, p. 127)

MONITORING: I don't understand. This doesn't make sense.

SIGNALING: What do I understand.

ANALYZING: How does this text work?

ELABORATING: What does this make me think of?

JUDGING: How good (etc.) is this?

REASONING: How can I figure this out. What might x mean?

APPENDIX H

Types of Moves

Types of Moves-Categories and Definitions

(Lytle, 1982, pp. 128-135).

MONITORING OF DOUBTS (M) includes statements or questions indicating the reader doubts his understanding.

M1 statement or question indicating reader is or was aware of own failure to understand, or own partial understanding of a word or words, sentence, or discourse level meaning; reader reports problems in understanding other than that associated with a hypothesis.

M2 statement or question point to conflicts within the text or between the text and the reader's knowledge or beliefs: perceiving a contradiction; expressing disagreement.

SIGNALING UNDERSTANDING (S) includes statements in which the reader signals his current understanding of the text's meaning by:

S1 reader states he agrees or disagrees

S2 reader paraphrases the sentence; paraphrase may be wrong or incomplete

S3 reader summarizes the meaning of the text by synthesizing several sentence meanings into one paraphrase

ANALYZING TEXT FEATURES (A) includes statement in which the reader, viewing the text as an object, notices, describes, or comments on features of the text, such as:

A1 choice, impact, or function of word(s); not just quoting, pointing or reading with emphasis

A2 syntax or length of sentence

A3 function of sentence or paragraph in relation to other sentences or paragraphs in the text; may indicate what sentence or paragraph is doing (e.g., comparing, restating, expanding); reference to text structure

A4 rhetorical aspects such as tone, type of discourse, discourse force, author's style or strategies, use of metaphor, analogy

ELABORATING THE TEXT (E) includes statements describing the ways the reader is responding to or experiencing the text, such as: (emphasis here is on the reader rather than the text)

E1 reader uses sensory imagery (visual, auditory)

E2 reader recalls prior knowledge or experience or recognizes that he lacks prior knowledge or experience

E3 reader makes reference to ideas stated previously in the text; reader notes connection(s) between earlier idea and current text

E4 reader constructs arguments that author might have made, but didn't

E5 reader responds personally in terms of interest, like or dislike; reader laughs

JUDGING THE TEXT (J) includes statements indicating the reader is evaluating (as distinct from responding personally to) the text according to various criteria, such as:

J1 appropriateness, effectiveness, difficulty, or importance of the statement or idea

J2 appropriateness, effectiveness or difficulty of text features, including all features listed under A

REASONING (R) includes statements or questions indicating that the reader is trying to resolve his doubts and interpret the text by using problem-solving approaches involving content or ideas:

R1 reader forms hypothesis or working assumption, including hypotheses about the writer's position; requires explicit acknowledgement of doubt or tentativeness; may use the work "might"

R2 reader makes a prediction about what is to follow, a prediction of the sort one would make from a hypothesis

R3 reader asks self a question in an attempt to construct the meaning (rather than as an indication of nonunderstanding); reader indicates he is searching for evidence in order to form a hypothesis

R4 reader indicates explicit (but not necessarily cited) use of evidence to confirm or disconfirm a hypothesis or prediction or to answer own question; reader comes to conclusion after doubt, hypothesis or question; reader makes an inference based upon evidence; may use the word "must"

Note: From Exploring Comprehension Style: A Study of Twelfth-grade Readers' Transactions with Text (pp. 128-135) by S. L. Lytle, 1982, Ann Arbor, MI: University Microfilms International. Copyright 1982 by Lytle, Susan Landy. Reprinted by permission.

APPENDIX I

GEFT and NDRT Scores of Population

GEFT and NDRT Scores of Population

GEFT	ND Vocabulary	ND Comprehension	Total
17	12.4	11.5	12.0
17	10.1	9.3	9.3
17	8.1	12.2	10.0
16	15.0	13.2	14.1
17	14.7	8.7	12.9
16	13.8	7.0	10.7
16	11.7	8.7	10.2
16	10.1	10.8	10.4
15	14.5	12.2	13.5
15	13.8	10.8	12.7
15	10.0	13.2	12.0
14	13.6	11.5	12.8
14	11.7	10.8	11.3
13	15.0	12.8	14.5
13	13.8	10.8	12.7
13	13.6	14.1	13.7
13	11.4	13.5	12.7
12	8.9	6.6	7.3
11	15.0	14.1	14.5
11	15.0	12.2	13.9
11	14.0	12.8	13.3
11	13.3	13.8	13.4
11	8.9	10.0	9.5
10	13.3	11.5	12.6
10	13.3	11.5	12.6
10	13.1	14.1	13.5
10	11.7	12.8	12.3
10	11.1	11.5	11.3
10	11.1	12.2	9.5
10	11.1	12.2	11.6
10	10.1	12.8	11.5
10	8.6	10.8	9.7
9	14.3	10.0	12.9
9	8.9	9.3	9.1
8	13.3	10.8	12.3
8	12.9	12.2	12.6
8	11.7	11.5	11.6
8	11.4	10.0	10.7
8	11.1	13.2	12.3
8	10.1	7.5	8.6
8	9.6	13.8	12.3
7	15.0	12.6	15.0
7	14.4	11.5	13.3
7	13.6	11.5	12.8
7	13.3	12.2	12.8
7	12.7	11.5	12.2

GEFT	ND Vocabulary	ND Comprehension	Total
6	12.9	10.8	12.0
6	12.7	12.2	12.5
6	12.4	7.0	9.5
6	8.6	10.8	9.7
5	14.0	11.5	13.6
5	13.8	13.8	13.6
5	13.8	10.8	12.7
5	13.3	13.2	13.1
5	11.7	8.1	9.8
5	10.9	14.1	12.9
4	13.3	12.8	13.0
4	13.1	10.0	11.8
4	12.4	12.8	12.6
4	11.7	11.5	11.6
4	10.9	10.0	10.4
4	8.1	10.8	9.3
4	7.9	8.7	8.1
4	7.3	7.0	6.4
3	12.0	8.7	10.4
3	11.1	11.5	11.3
3	10.1	10.0	10.0
3	10.1	10.0	10.0
3	7.9	10.0	8.0
2	13.5	13.2	13.2
2	13.5	11.5	12.7
2	12.9	14.4	13.6
2	11.4	10.0	10.7
2	10.5	7.5	8.8
2	9.2	8.7	8.9
2	8.6	13.8	11.8
1	8.6	9.3	8.9
1	8.6	8.7	8.6
0	11.7	7.5	9.5
0	7.9	8.1	8.1

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Vita

Jane Becker, the daughter of Amanda and the late Glenn Timmins, was born on September 24, 1941, in Pottsville, Pennsylvania.

She was graduated from Blue Mountain High School in 1959. She received the Bachelor of Science degree in Secondary Education from West Chester State College in 1963 and began her teaching career in the Schuylkill Valley School District during the same year.

She earned the Master of Education Degree in Secondary Counseling from Kutztown State College in 1973. In 1974 she became a counselor in the Ability Development Program at Kutztown State College. In 1982 Mrs. Becker received certification in developmental education from Appalachian State University, and in 1984 she was certified by the National Board for Certified Counselors. She completed the Reading Specialist Program at Lehigh University and was certified as a reading specialist in 1984. Since then she has taught developmental reading at Kutztown University, where she is Associate Professor of Developmental Studies.

Mrs. Becker is a member of the National Reading Association, the National Association of Developmental Educators, the Pennsylvania Association of Developmental Educators, the American Association for Counseling and Development, and the American College Personnel Association.