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A COMPARISON OF READING PERFORMANCES EXHIBITED BY PROFICIENT, AVERAGE, AND DEFICIENT READERS IN FOURTH GRADE

By

Lorraine Mary Leidholdt

A DISSERTATION

Submitted to
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ABSTRACT

A COMPARISON OF READING PERFORMANCES EXHIBITED BY PROFICIENT, AVERAGE, AND DEFICIENT READERS IN FOURTH GRADE

by

Lorraine Mary Leidholdt

Four performances described in a subskills model of reading were used to compare the reading behavior of three groups of fourth grade readers. If Proficient readers exhibited these reading performances to an extent which differentiated them from Average and Deficient readers, the performances could be considered descriptors of proficient reading behavior. Thirty-six subjects were classified as Proficient, Average, or Deficient readers according to a measure of reading comprehension, one of the performances defined in the model under investigation. Individually administered tests measured performance in appropriate sight vocabulary, appropriate applied decoding behavior, and the following variables of fluent texting: 1) rate, 2) attention to punctuation, 3) semantically acceptable word miscues, 4) syntactically acceptable word miscues, and 5) self-correction behavior. An eighth variable, the total number of word miscues, was also examined.

When group means were compared using a multivariate analysis, significant differences were found between reader groups. These differences indicated that the four reading performances differentiated between the three groups of readers.

Further analyses located the specific areas of difference between the reader groups. Univariate test results indicated that reader groups differed significantly on six of the eight variables. A post hoc procedure, which compared pairs of group means, located further areas of difference. Proficient and Average readers differed on three of the variables, while Proficient and Deficient readers differed on six. No differences were found between the Average and Deficient readers. The findings of the first three analyses of data have instructional implications since the performances depend on underlying subskills for their adequacy. Indications of what Proficient, Average, and Deficient readers have learned were found, supporting the model as both a diagnostic and instructional tool.

A bivariate correlational analysis determined the degree of relationship amongst the eight variables themselves and with reading comprehension. Several were found to have significant relationships one with another and with reading comprehension. These findings indicated that the performances in the model are interactive in nature, each influenced by the adequacy of the others. This interactive nature indicates that reading is a complex process which cannot be acquired through mastery of a unitary skill.

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1983

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Chapter 1

INTRODUCTION TO THE PROBLEM

During the past four hundred years, educators created multiple theoretical models of the reading process in an effort to determine what children need to know to become proficient readers (Mathews, 1966). Many of these models present opposing views concerning not only what to teach, but how best to teach it. In the ensuing confusion (Chall, 1967), many classroom teachers have found that these complex and conflicting data obscure both the instructional components and methodology to be used in an effective reading program which would guarantee that all students achieve reading proficiency.

In a discussion of models of reading and reading disability, Guthrie (1973a) classified the diverse models into two categories. The first category included models which represent the reading act in terms of cognitive process functioning (Singer, 1969; Goodman, 1967). Researchers who view reading in this way administer batteries of psychological tests to groups of good and poor readers and investigate such processes as visual and auditory perception, memory, verbal association, and language. Scores achieved by each group are compared to determine in which cognitive processes the good readers differ from the poor. The assumption behind these models is that reading disability is caused by some malfunction or deficiency within the individual, rather than by inappropriate or inadequate reading instruction.

The second group of reading models described by Guthrie represent the reading process as a learned activity which is achieved after instruction in, and mastery of, a set of reading subskills (Rhystrom, 1970; Holmes, 1960). The subskills include those of word recognition, such as letter identification and letter-sound relationships, and those of text comprehension, such as classification and main idea. A direct relationship between effective teaching and reading achievement is assumed in these models. Feedback concerning the appropriateness and effectiveness of instruction is obtained by observing, measuring, and evaluating aspects of reader performance in both the subskill areas of word recognition and comprehension.

Each of the two categories of models described above is further divided into subcategories according to the assumed relationship between components. In both categories there are models based on the assumption that the components, whether cognitive or subskill, develop and operate independently of one another. During reading, the components are thought to operate serially, one right after another. Due to this independent nature, components can exist at differing degrees of strength within an individual reader. Furthermore, a weakness in one is not expected to interfere with the development and operation of the others. Since the components are thought to be learned and used as an assembly of independent factors, Guthrie has labeled these as "assembly" models.

In contrast to the assembly model is a view which assumes that the components, in both categories, develop and operate interactively. Proponents of this view assume that during the act of reading, the components interact with one another. Due to this interactive nature, a deficit in one component will interfere with the development and

operation of the others. Rather than a reading disability being the result of a single-component deficit as in the assembly models, these "systems" models assume that a complex, interdependent relationship exists between components.

In summary, Guthrie defined two categories of reading models. The cognitive processing category depicts reading as an act which results when specific cognitive processes function adequately. These components or processes, are assumed to operate either independently as in the assembly models (Bateman, 1969; Johnson and Mykelbust, 1967), or interactively as in the systems models (Goodman, 1967; Gibson, 1965). Although the cognitive process category of reading models offers insights into what may or may not be transpiring mentally, the practical implications for reading instruction appear limited. Teachers are neither trained to administer or interpret psychological tests, nor prepared to effect the functioning of cognitive processes. Stauffer, Abrams, and Pikulski (1978) stated that even if areas of cognitive malfunction could be corrected, teachers are still faced with the responsibility of providing a sound program of instruction. This first category of models then, because of its psychological orientation, does not offer insights into the age-old problem of what children need to know to become proficient readers.

The second category of models of reading discussed by Guthrie (1973a),the subskill models, depicts reading as a learned process which results after instruction in a set of reading subskills. Within this category are models which, like the cognitive category, assume that the components develop and operate either independently (Holmes, 1960) or interactively (Rhystrom, 1970). Since this category depicts reading

as a learned activity, it appears that research using these models should provide more practical information for teachers concerning what it is that children need to know to become proficient readers.

BACKGROUND

As previously stated, the subskill category of models of the reading process appears to offer useful instructional information for planning a sound reading program. Therefore, investigation of such models should result in useful information for classroom practitioners who bear the major responsibility for reading instruction and achievement.

One such subskill model, the Model of Reading and Learning (MORAL), was developed by Sherman (1979). It is based on the premise that it is possible to determine what readers have learned by observing how they perform in specified skill areas during a reading task. Sherman defines four terminal behaviors (performance signs) which he assumes skilled readers will demonstrate during reading tasks. Each of these performances is considered to be an observable, quantifiable sign of proficient reading and each depends on the mastery of several underlying subskills (skill effectors) (See Table I-1). Proficiency in each sign is measured by a grade level performance score that matches or exceeds the reader's school grade placement.

The MORAL was originally developed for use as a diagnostic framework against which to evaluate the reading performances of disabled readers in a clinical setting. As implied in its name, the MORAL incorporates aspects of both "reading" and "learning" into one model. As a diagnostic tool, the "reading" aspect, which consists of

the four performance signs and the skill effectors upon which they are built, is observed first. The diagnostician measures and evaluates each

TABLE I-1

THE PERFORMANCE SIGNS OF PROFICIENT READING AND THE SKILL EFFECTORS IN SHERMAN'S MODEL OF READING AND LEARNING (MORAL)

	Vital Sign		Skill Effectors
I-A	Appropriate Sight Vocabulary	I-B	Word Perception Skills Discrimination Letter Sequencing Word Association Word Memory
II-A	Appropriate Applied Decoding Behavior	II-B	Sound Associations Consonants Multi-letter Consonants Multi-Letter Vowels Phonograms and Transfers Segmentation of Multisyllable Words Blending and Adjustment of Sounding Words
III-A	Fluent Texting Behavior	III-B	Adequate Word Recognition At Sight and/or Analysis Attention to Internal/ External Grammar Systems Attention to Internal/ External Message Referents Integration of Skill Effectors
IV-A	Text Comprehension	IV-B	Information Acquisition Attention Selection Conceptualization Inferencing Process Product

of the four performance areas, and then, if necessary, investigates the adequacy of each skill effector (see Table I-1). For example, a student in the third month of fourth grade, would have an adequate sight vocabulary if a grade equivalent score of at least 4.3 was obtained on a measure of such. If a score less than 4.3 was achieved, the diagnostician would then search for the cause of the deficiency by investigating and measuring the four word perception skill effectors listed in the MORAL for this sign. If the skill effectors were found to be adequate, the cause of the deficient sight vocabulary would not be in the "reading" aspect of the MORAL. The diagnostician would then investigate the two areas described in the "learning" aspect, which include affective and personal factors that influence reading achievement. (See Appendix A.) However, since these learning effectors are often not quantifiable, they are not included for investigation in this study. Only those included in the "reading" aspect are under consideration.

The factors included in the "reading" aspect of the MORAL allow the model to fit into the subskill category of reading models discussed by Guthrie (1973). However, at this time, the relationship between the subskill components has not been established as being either independent, as in the assembly models, or interactive, as in the systems models. As Sherman (1979) explains, the relationship could be either, or possibly both:

> Each (performance sign) identifies a subsystem of the total reading process... They can be observed to operate individually, or they can interact with each other. Deficits

in one can affect only that sign, or it can affect each of the other three.[1]

Neither the performance signs themselves, nor the relationship between them have been confirmed yet because the MORAL has been used exclusively with disabled or below grade level readers. It is possible that different patterns of relationships will occur when the model is used with skilled readers.

PURPOSE OF THE STUDY

It is the purpose of this study to determine if the four reading performances defined in Sherman's Model of Reading and Learning (1979) are the behaviors exhibited by Proficient readers and differentiate them from Average and Deficient readers.

To examine this proposition, fourth graders were classified as Proficient, Average, or Deficient readers according to the score achieved on a measure of reading comprehension, one of the performance signs in the MORAL. Individuals were then tested on the remaining performance signs in the MORAL: 1) sight vocabulary, 2) appropriate applied decoding behavior, and 3) fluent texting. Since at this time, no standard definition or measure of fluent texting behavior is available, it was necessary to define this performance in terms of an oral language performance, whereby the reader sounds as though he were speaking while reading from a text. However, this definition does not

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[1]George B. Sherman, "Introduction to Reading Diagnosis: A Diagnostic Model." (Course handout, Michigan State University, 1979), p. 4.

translate into an objective quantifiable measure, as it relies on a subjective interpretation by the listener. Therefore, five skill effectors which are assumed to be part of a fluent texting behavior, and which have been investigated separately in related literature (see Chapter 2) were measured. For this study, these individual skill effectors are: 1) reading rate, 2) response to punctuation, 3) the number of semantically acceptable word miscues made, 4) the number of syntactically acceptable word miscues made, and 5) the number of self-corrected word miscues made during an oral reading performance. These five variables will be measured and compared in the performance area of fluent texting behavior.

In addition, an eighth variable, total number of word miscues made, will be investigated during the oral reading performance. This is a quantitative count of all the word mispronunciations made by the reader.

HYPOTHESIS

Stated in the null form, it is hypothesized that there will be no differences between the mean group scores for the three groups of readers on all eight variables.

Given that the performance signs in the Model of Reading and Learning are supported by the data, that is, that the readers who are proficient in reading comprehension differ on the measures of the other performances from those who are average or deficient, the signs can be considered reliable descriptors of a proficient reading performance.

Furthermore, since a proficient performance in each of the signs described in the MORAL is assumed to be related to the mastery of several subskills, the value of including these subskills (skill effectors) as instructional components in reading programs will be supported.

ASSUMPTIONS AND LIMITATIONS

Several assumptions are incorporated in this research study. A first assumption is that it is possible to determine what children need to know to become proficient readers by examining what they do during actual reading tasks. A second assumption is that fluent texting behavior, which has not yet been satisfactorily defined in the field of reading, can be examined and described by the variables used in this study. A last assumption is that the scores used on the measure of reading comprehension, the criterion for group classification, are precise enough to accurately place readers.

The following three limitations underlie this study. First, the findings of this study are restricted by the inherent reliability and validity of the several measurement instruments used. Second, the change of setting required in order to do the individualized testing, along with the presence of a researcher or research assistant, may affect a subject's performance. Finally, generalization of the conclusions of this investigation is limited by the characteristics of the specific fourth grade population from which the sample is drawn.

DEFINITIONS

Appropriate rate: The number of words orally read per minute in a passage. The average rate is approximately 140 words per minute

for skilled readers at and above the third grade level of reading achievement.

Average reader: A fourth grade student who attains a raw score of 21, 22, or 23 on the Gates-MacGinitie Reading Test, Level D, Form 1. These scores correspond to grade equivalents of 4.5, 4.9, and 5.1, respectively.

Attention to punctuation: In the analysis of data, attention to punctuation includes the number of punctuation marks the reader responded to correctly, using proper juncture, stress and pitch which are signals for the listener. This is also one of the skill effectors necessary for a fluent texting behavior.

Decoded word analysis: The reader's ability to apply knowledge of the grapheme-phoneme (letter-sound) relationships of the English spelling system as an aid to word identification during a reading task. This is also one of the performance signs in Sherman's Model of Reading and Learning.

Deficient reader: A fourth grade student who achieves a raw score of 20 or below on the Gates-MacGinitie Reading Test, Level D, Form 1, Comprehension subtest. These scores correspond to grade equivalents of 4.3 or less.

Fluent texting behavior: The ability of the reader to give a smooth oral reading performance which exhibits the following characteristics:

1. appropriate rate
2. attention to punctuation
3. demonstration of the use of language integration into the reading act as measured by:

a. semantically acceptable word miscues, and

b. syntactically acceptable word miscues.

Good-Reader quotient: The total number of word mispronunciations (miscues) made by the reader during the oral reading of graded passages. During the analysis of data, this number is used as the divisor for the number of syntactically and semantically acceptable word miscues, as a means to arrive at their percentage scores.

Grapheme-phoneme relationships: The letter-sound redundancies of the English spelling system which are usually predictable and consistent. Included are: knowledge of single consonant sounds, consonant digraphs, consonant blends, vowel phongrams, syllable principles and accent generalizations.

Message or text comprehension: The ability to extract information from the printed text, as demonstrated by correctly answering questions following the reading of a passage.

Proficient reader: A fourth grade student who achieves a raw score of 24 or above on the Gates-MacGinitie Reading Test, Level D, Form 1, Comprehension subtest. These scores correspond to grade equivalent scores of 5.3 to 11.1.

Self-corrected word miscues: These are corrected miscues made by the reader during oral reading.

Semantically acceptable word miscues: Word mispronunciations made by the reader where a synonym is substituted for the original word. The substitution does not affect or change the underlying meaning component of the sentence or message.

Semantics: The underlying meaning component of spoken or written messages.

Sight vocabulary: The number of words a reader can pronounce instantly from a graded word list.

Syntactically acceptable word miscues: Word mispronunciations made by the reader where the mispronounced word is substituted with a word that is of the same part of speech.

Syntax: The grammar and word order used in the English language, which speakers, listeners, readers and writers use without formal instruction or conscious awareness.

SUMMARY AND OVERVIEW

Chapter 1 contained the introduction and background of the study, as well as a statement of the problem. The significance of the research investigation was discussed, along with the assumptions, limitations and hypothesis.

Chapter 2 is a review of literature and related research studies which investigated the four reading performances proposed by Sherman in his Model of Reading and Learning.

Chapter 3 is an explanation of the design of the study. It contains a description of the target population, the sample, and the criterion for reader-group placement. Also included is a discussion of the data collection procedures, instrumentation, and the design for the analysis of the data.

Chapter 4 contains the results of the analysis of the data as well as interpretation and discussion.

Chapter 5 provides a summary of the study, conclusions drawn, implications and recommendations for future research.

Chapter 2

INTRODUCTION

Overview of the Chapter

One of the primary concerns of classroom teachers is finding an answer to the question: What do children need to know to become proficient readers?

Researchers have searched for an answer to this question in several ways. Some have researched the cognitive processes of the mind, while others have investigated the reading task itself (Guthrie, 1973). Gibson (1965) feels that research can and should serve the classroom teacher, and offers the following insights:

> A prerequisite to good research on reading is a psychological analysis of the reading process. What is it that a skilled reader has learned? Knowing this (or having a pretty good idea of it), one may consider how the skill is learned, and next, how it could best be taught.[2]

Gibson (1965) proposes that an answer to the problem concerning what to teach can be found by observing skilled readers. In essence, this is the premise on which Sherman (1979) based his Model of Reading and Learning (MORAL) which is under investigation in this study.

In the Model of Reading and Learning, Sherman describes four reading performances which skilled readers should exhibit. Two of these performances, when measured, demonstrate the reader's level of word recognition skill, both at sight and decoded. A third performance area,

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[2]Eleanor J. Gibson, "Learning to Read," Science, 148 (1965), 1068.

text comprehension, demonstrates the reader's ability to understand connected text. During the measurement of the fourth performance area, fluent texting behavior, the reader demonstrates how well he can use language cues to produce rapid, fluent oral reading.

The relationship between the performances in Sherman's Model of Reading and Learning (1979) has yet to be determined. They may operate independently in serial order as in Guthrie's (1973a) assembly models, or they may be interactive in nature. This means that each performance may affect and/or be affected by the skill the reader has in one or more of the other performances.

For this research study, which seeks to determine if the performances defined in the Model of Reading and Learning are descriptors of proficient reading behavior, the performance area of reading (text) comprehension served as the criterion for reader group placement. Chpater 2 is therefore organized so that each of the performance areas is discussed as an independent system and also in its relationship to reading comprehension.

Sight Vocabulary, Decoding Behavior, and Comprehension

In Sherman's Model of Reading and Learning (1979), word recognition is separated into two distinct performances: appropriate sight vocabulary and appropriate applied decoding behavior, each of which can be measured separately, In reviewing the literature and research, rarely was such a distinction made. Instead, the term "decoding" was frequently used to describe both the visual (instant) and decoded aspects of word recognition. Hence, for ease of discussion, the two performances will be reported jointly.

What is the relationship between word recognition and reading comprehension? The search for an answer to this question led LaBerge and Samuels (1974) to develop a theory of "automaticity." This theory is built on the assumption that the mind can only attend to one thing at a time, and works as a "limited-capacity" central processor of information. Reading, like listening, is viewed as a process of information extraction, although the sensory input is purely visual. If the reader focuses his attention on recognizing words, he will not be able to get the meaning of the text, as the mind can only do one thing at a time. However, if the reader responds automatically to word identification, that is, if he can pronounce a word instantaneously without having to focus on its component parts (letters, letter-order, etc.), he can attend to the meaning component.

When developing this theory, LaBerge and Samuels (1974) assumed that all readers went through the same series of stages in learning to read, although at different rates. Information processing, or understanding of the text, was assumed to begin with the visual input (graphics) on the page, and pass through a series of stages "en route to meaningfulness." LaBerge and Samuels viewed reading as a skill built on a set of subskills appropriate to and learned at each stage. A fluent reader then, is one who has mastered each subskill to the level of "automaticity." A subskill is automatic if the reader can complete its processing while his attention is directed elsewhere.

LaBerge and Samuels (1974) proposed that the two indicants of "automaticity" were accuracy and speed of response (latency) to a stimulus, with the latter being the more critical. A slow response time, they explained, indicates that a reader is focusing his attention on

recognition of the component parts which would result in impaired comprehension. Therefore, a direct, strong relationship between word recognition and reading comprehension is assumed in this theory. Since the relationship is unidirectional, beginning with the visual input of the text, and proceeding to higher thought processes, this type of model has been termed a "bottom-up" model of information processing (Samuels, 1980) as well as a "serial-stage" subskill model (Stanovich, 1980), while in Guthrie's classification scheme (see Chapter 1) it would be an "assembly subskill" model.

If the LaBerge and Samuels (1974) theory of automaticity is valid, then readers who have fast, accurate word recognition skills should also have good reading comprehension ability. Conversely, poor comprehenders will be less accurate and have longer response latencies in word recognition tasks. To test this hypothesis, Perfetti and Hogaboam (1975) classified third and fifth grade students as either skilled or less skilled readers according to the score achieved on a standardized measure of reading comprehension and presented them with words to "decode." Decoding was defined as the transfer of the written code to the language code and involved both instant and decoding aspects of word recognition. High and low frequency real and nonsense words were flashed on a screen for 15 seconds. When pronounced, they disappeared from view to discourage further analysis. Response time was recorded for each word. It was found that the two groups of readers differed in vocalization latency, and that on all types of words the skilled comprehenders had shorter vocalization times. From the results of this correlational study, the authors concluded that rapid word

recognition latencies were related to good comprehension, but the direction of causal relationships between the two variables could not be determined.

Hogaboam and Perfetti (1977), intrigued by the results of the 1975 study which demonstrated that skilled readers were superior to less skilled readers on response time to nonsense words, designed an experiment to see if this difference was due to better implicit knowledge of "subword" units (spelling patterns, letter position, etc.). Third and fourth grade students were classified as skilled and less-skilled readers according to a standardized measure of reading comprehension. Using the same procedure as in the 1975 study, one and two-syllable real and nonsense words were presented on slides and response latency was recorded. Analysis of the results indicated that, once again, skilled readers had shorter vocalization latencies for both real and nonsense one and two syllable words. One conclusion from this study was that subword decoding processes are implicated as a source of difference between skilled and less-skilled readers, even when both types of readers are given the same training and experience with such words.

The results of the 1977 study by Hogabaom and Perfetti support the findings of Golinkoff and Rosinski (1976) who investigated the relationship of reading real and nonsense words from lists, to reading comprehension ability. The subjects were third and fifth graders grouped according to a reading comprehension score as skilled or less-skilled readers. All subjects read through two word lists: 1) a nonsense word list to evaluate their decoding skills, and 2) a list of first grade words for instant recognition. Response latency was recorded. On the decoding task, skilled readers took significantly

less time to read the nonsense words, but on the list of real words, although their response time was shorter, it was not significantly so. Since most of the first grade level real words would presumably be in the third and fifth graders' sight vocabulary due to practice, the LaBerge and Samuels (1974) theory of automaticity, which states that, with practice, a reader can process a visual stimulus instantly, seems to be supported.

In summary, skilled readers (comprehenders) in the studies discussed above responded faster and more accurately on real and nonsense word reading tasks. The words were presented to the subjects one at a time, either by flashing them on a screen or reading them from a list. The conclusion drawn concerning the relationship between non-contextual word recognition and reading comprehension is that there is a correlation between the two, but the nature and direction of the relationship is not known.

However, as previously stated, LaBerge and Samuels (1974) proposed that the relationship is unidirectional, beginning with the visual input and proceeding to meaning. Hence, good word recognition skill is a prerequisite for good comprehension. If this is the case, then one would expect that all children could become skilled comprehenders by ensuring that the words they were to encounter in a text were first learned to the point of automaticity.

To investigate this assumption, McCormick and Samuels (1979) presented words of first and second grade difficulty to second graders (non-ability grouped), using an A.V. trainer which flashed the word on a screen for seven seconds. An experimenter recorded the accuracy of word pronunciation while the A.V. trainer recorded the latency in tenths

of seconds between the projection of the word and the subject's pronunciation. These words were then read in two contexts, one oral and one silent. For the comprehension measure, a free-recall procedure was employed. In the data analysis, McCormick and Samuels found a correlation of .88 between latency and accuracy of word recognition. The correlations between these two aspects of word recognition and reading comprehension ranged from .49 to .70, and all were significant beyond the .006 level. From this, the authors concluded that high accuracy and rapid word recognition in reading words in isolation were associated with high comprehension of text which incorporated these same words.

Shankweiler and Liberman (1972) defined skilled reading in terms of oral reading fluency and word recognition to see if fluency, like comprehension, could be predicted from a performance of reading a word list. Second, third and fourth graders read two lists of words, and responses were evaluated for accuracy and latency. They then read paragraphs from the Gray Oral Reading Test which contained these words. Fluency was measured by computing a composite score based on reading time and error rate. They found a moderate-to-high correlation between the errors on the word lists and performance on the Gray paragraphs (.53 to .77). Shankweiler and Liberman concluded that the major barrier to fluent reading is at the word level and that a student can read connected text only as well as he can read individual words.

Both the McCormick and Samuels (1979) and Shankweiler and Liberman (1972) studies seem to indicate that good word recognition skill equals good reading (both in fluency and comprehension). However, Oaken, Wiener and Cromer (1971), investigating this same relationship, came to a different conclusion. Fifth graders were

grouped according to a measure of reading comprehension as either poor or good readers. The authors assumed that training poor readers to identify all the words to be found in stories to be read should lead to improved comprehension for this material. Contrary to the findings of McCormick and Samuels (1979), no appreciable improvement in comprehension was found for the poor readers. They concluded that good word identification is not a sufficient condition for good comprehension for all readers and that something more is involved in being a good comprehender than being a good identifier of words. Oaken et al (1971), proposed that poor readers had to be trained to respond to words in groups in order to effectively use syntactic boundaries. In short, the ecological validity of training students to rapidly read words in isolation and expecting this ability to transfer to contextual reading was questioned. While reading connected text, the reader is provided with semantic (meaning) and syntactic (grammar) cues, as well as the subword grapho-phono components. What effect does the use of semantic and syntactic cues have on good and poor reader's ability to recognize words? Finding answers to this question leads into a discussion of fluent texting, as most of the studies done involved quantitative and qualitative analysis of oral reading errors made while reading connected text.

Fluent Texting Behavior

Sherman (1979), in the Model of Reading and Learning (MORAL), describes a fluent texting behavior as the overlay of language onto reading. The performance depends on the integration of the first two word recognition performances in the MORAL with the syntactic and

semantic language cue systems. In other words, a fluent oral reader will use and integrate the three language cue systems.

Several researchers have investigated the effect that the use of the syntactic and semantic contextual cues has on word recognition during reading. This was done through the analysis of oral reading errors. Before 1968, oral reading error analysis was done as a number count of word mispronunciations made during contextual reading (Leu, 1982). Word substitutions, reversals, omissions, insertions and other types of errors were tallied and equated with a grade level score. Readers making the most word errors were considered to have the least reading ability. At that time, no attempt was made to linguistically evaluate the errors in terms of their effect on the semantics and syntax of the text.

Two theorists, Goodman (1967) and Smith (1971), who support a top-down (cognitive systems) model of the reading process, are the main proponents of a class of theories which posit a large role for the use of sentence context during reading. Goodman (1967) views reading as a language based process during which readers, like listeners, predict forthcoming words and information by using knowledge from prior experience, as well as prior contextual information. According to Goodman, the reader has three language cue systems available for his use: 1) the grapho-phono cues (letters and sounds), 2) the syntactic cues (grammar), and 3) the semantic cues (meaning system). He terms reading a "psycho-linguistic guessing game" during which the fluent or skilled reader needs only sample the graphic code of the text to confirm or disconfirm his predictions about forthcoming words or information. Goodman feels that the graphic code of language (letters) holds no

meaning and therefore does not aid the fluent reader in gaining meaning from the text. Word recognition errors have little to do with letter-sound skills. Instead, Goodman feels that they are the result of semantic or syntactic "miscueing". Word recognition errors occur because the reader predicted the wrong word either because he did not know something or he was careless in applying what he did know.

Similarly, Smith (1971), a psycholinguist, views reading as a language based process. To Smith, fluent or skilled reading is only possible when the reader makes use of prior context to reduce the amount of visual information needed for word recognition. Also, the fluent reader is able to make use of the redundancies inherent in spoken language at all three levels of processing: grapho-phono, syntactic and semantic. Like Goodman (1967), Smith feels that the goal of reading is meaning; that the reader brings meaning to the printed page, and that letters and sounds-of-letters are in themselves meaningless.

There are many similarities between the Goodman (1967) and Smith (1971) points of view. Both agree that: 1) the skilled reader uses more contextual cues than the less-skilled reader, and 2) the skilled reader uses less graphic information than the less-skilled reader. Both feel, in short, that context cues guide the word identification process.

Support for Smith (1971) and Goodman's (1967) view concerning the role played by context in word identification can be found in several studies. Goodman (1965), in a linguistic study of cues and miscues in oral reading, had first, second, and third grade students of all reading abilities read words from a list, and then read

the same words in the context of a story. He found that, on the average, the subjects could recognize words in context that they had been unable to pronounce in isolation. One of his conclusions was:

> The children in this study found it harder to recognize words than to read them in stories. Eventually I believe we must abandon our concentration on words in teaching reading and develop a theory of reading and methodology which puts the focus where it belongs: on language.[3]

Klein and Klein (1973) also investigated the effect that semantic and syntactic cues has on word recognition performance. College students were given a word boundary task in which words in sentences were printed with no additional space between them so they looked like a continuous stream of letters. The subjects, unclassified as to reading ability, were to draw slashes between word boundaries. Some of the words were in random order, while others were in a grammatical sequence. The authors hypothesized that the words in grammatical order would be easier and faster to identify because of the semantic and syntactic cues provided by the context. They found that the words embedded in meaningful context were identified significantly faster and more accurately than the ones in random order. They concluded that "contextual information provides the primary means to limiting the set of alternatives (for word identification)."[4]

Wisher (1976) examined the influence of knowing the syntactic structure of a sentence before reading, and its influence on word identification as well as memory. He hypothesized that syntax

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[3]Kenneth S. Goodman, "A Linguistic Study of Cues and Miscues in Reading," Elementary English, 42, (1965), p. 423.

[4]Gary A. Klein and Helen A. Klein, "Word Identification as a Function of Contextual Information," American Journal of Psychology, 2, (1973), p. 405.

organized the text for a reader, and that this organization would aid word identification, learning, and recall. Prior knowledge concerning syntactic structure then, would reduce the time and effort that syntactic analysis might otherwise take. In the first part of a two part experiment using college undergraduates, the subjects were required to remember irrelevant material while simultaneously reading a sentence. The author assumed that the greater the effort devoted to reading, the less would be the effort devoted to remembering. In the second part of the experiment, reading speed for individual sentences was recorded. Syntactic expectations were induced by blocking some sentences into units according to syntactic structure. Other sentences were not blocked. The assumption was that the less time needed to formulate the syntax, the faster the reading would be. The results indicated that both assumptions were correct. Subjects read faster and with less effort if they knew the structure of the sentence beforehand. Wisher concluded that "precise syntactic expectations reduced linguistic computation and its related memory requirements which, in turn, saved the reader time and effort."[5]

Tweedy, Lapinski and Schvaneveldt (1977) used a modified "lexical decision" task to investigate the potential usefulness of a context word as a predictor of the semantic identity (meaning) of a following word. Two groups of college students, unclassified as to reading ability, were placed into either a "high-likelihood" or a "low-likelihood" group. The high-likelihood group was presented with either a

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[5]Robert A. Wisher, "The Effects of Syntactic Expectations During Reading," Journal of Educational Psychology, 68 (1976), p. 601.

or nonsense word which was usually followed by a semantically related word (e.g., army-navy). The low-likelihood group was presented with either a word or nonsense word followed by an unrelated word (e.g., army-uncle). The authors hypothesized that the lexical decisions about a word would be faster if the words were semantically related. In the analysis of the data, the experimenters found that the appropriate semantic context (semantically related words) facilitated word recognition. They also found that more facilitation occurred in the high-likelihood group which had come to expect related words. Tweedy et al, concluded that readers who expect facilitation from prior context are more likely to use contextual strategies as an aid to word recognition.

The results of the four studies discussed (Goodman, 1965; Klein and Klein, 1973; Wisher, 1976; and Tweedy, et al, 1977), provide empirical evidence that the use of semantic and/or syntactic contextual cues can and does aid word recognition. However, since the subjects in these studies were not classified as to reading ability, it is impossible to determine whether or not skilled readers make more use of context than do less-skilled readers. In the next section, studies which compared skilled and less-skilled readers' use of semantic (meaning) cues will be discussed.

Semantic Context Effects and the Skilled Reader. Steiner, Wiener and Cromer (1971), investigated skilled and less-skilled readers' ability to use context as an aid to word identification. They hypothesized that if skilled readers made better use of information presented in a text as an aid for word identification, then, by giving less-skilled readers supplementary contextual information (i.e., comprehension training), word identification should be likewise

facilitated. Fifth graders, reading at or above grade level were labeled good readers according to a standardized reading test score. Those scoring below grade level were labeled poor readers. Subjects orally read under four conditions: 1) a single word presentation with no comprehension training, 2) a single word presentation with comprehension training,3) a paragraph presentation with no comprehension training, and 4) a paragraph presentation with comprehension training. It was found that the comprehension training did not significantly effect the word errors made by poor readers in the paragraph reading task. It was also found that both poor and good readers made significantly fewer errors with a single word mode of presentation than with a paragraph mode. The authors concluded that context aids word identification in general, but that poor readers do not make use of the semantic and syntactic language cues in oral reading even when given training. The results of this study lend support to Sherman's (1979) assumption that skilled readers are able to make use of the syntactic and semantic contextual cues.

More support for this view comes from a study done by Isakon (1979). Forty-eight students at each of five grade levels (1-6) were classified as skilled or less-skilled readers according to a standardized measure of reading comprehension. Prior to the experiment, it was determined that both groups had similar word identification skills. Isakon predicted that if a group of readers had adequate word recognition skills, the differences between the two groups of readers in the number of word errors made during oral contextual reading could then be attributed to the use of semantic cueing rather than to word recognition problems. All subjects orally read four sentences which

matched their grade level placement. Isakon found that the good and poor comprehenders at all grade levels, though they had similar word recognition ability, differed significantly in their ability to read words in context. At each grade level, the poor comprehenders made significantly more word recognition errors. Isakon concluded that the good comprehenders were better users of semantic contextual information as an aid to word idenfification than were the poor comprehenders.

Samuels, Begy, and Chen (1976-77) came to the same conclusion as Isakon (1979) in a study of good and poor readers in the fourth grade. In this study, fourth graders were classified as good or poor readers according to a score achieved on a standardized reading achievement text. A week before the experiment was scheduled to begin, all subjects were tested on the words that they would encounter to insure that all could be recognized. During part of the experiment, the subjects were shown an adjective followed by the partial representation of a noun (e.g., deep sn__). Only responses which matched the predetermined noun were counted as correct. The difference between the mean number of correctly read partial words was significant between the good and poor readers. The authors concluded that the skilled readers made better use of both the semantic and graphic cues of context as an aid to word recognition. The results of this study support the proposition made by Sherman (1979) that skilled readers make better use of language cue systems.

Schvaneveldt, Ackerman and Semlear (1977) used a "lexical-decision" task to determine how second and fourth graders benefit from prior semantic context and came to a different conclusion than Steiner et al, (1971), Isakon (1979), and Samuels et al, (1976-77). All

subjects read paired common words, which were either highly associated (king-queen) or unassociated (bread-queen), as well as non-word pairs (wrdt-ptfq), and word-nonword pairs (here-wdst). If a subject identified the pairs as real words, he pushed a "yes" button. If nonwords or word-nonword pairs were identified, he pushed a "no" button. These buttons activated a timer which measured response latency. Following the completion of this task, the authors compared the relationship between reading ability and performance on the lexical decision task by correlating scores from a standardized achievement test with the mean reaction times and the mean context effect. It was found that for both the second and fourth graders, reaction times decreased as test scores increased. In other words, good readers identified words faster than poor readers. When the relationship between the context effect and the test scores were correlated, the correlations were negative. This latter result led the authors to conclude that young and poor readers use semantic context as much as do better readers. In fact, younger children showed a somewhat larger context effect.

West and Stanovich (1978) investigated the influence that developmental changes might have on the use of sentence context as an aid to word recognition. Smith (1971) and Goodman (1967) feel that less-skilled and hence younger, beginning readers, make less use of context than do older, skilled readers. But the findings of the Schvaneveldt et al study (1977), contradict this proposition. West and Stanovich hypothesized that both the ability to use contextual information as well as the ability to process information automatically are involved in proficient reading. Therefore they reasoned that perhaps the poorer and younger readers made more use of context

because their word recognition skills were not yet developed to the point of automaticity. Fourth and sixth graders and college students were given three tasks in this experiment which would indicate their degree of automaticity in word recognition. Task One (I) was a word reading task where subjects orally read a target word preceded by either a congruous or incongruous sentence, or just the word "the" (no-context). In the analysis of the data, it was found that the mean length of time required to read target words was significantly shorter in the congruous context condition than the no-context condition for all three groups. However, the magnitude of the context facilitation effects did not increase with age. When the facilitation scores were compared to scores on a standardized reading text, negative correlations were found, indicating that larger facilitation effects were associated with lower reading ability. In other words, the findings indicated that poor readers used context more than good readers of all ages as an aid to word recognition.

In the same study, West and Stanovich (1978) had the subjects do two other tasks; a word and color naming task, and a nonword-color naming task. In the word-color naming task (Stroop effect) the procedure was similar to that of Task One (I) above, except the subjects were asked to name the color in which the target words were printed, not the target words. The authors hypothesized that an effect of context condition in this task would indicate if contextual facilitation was due, at least partly, to automatic processes. Task 3 had a similar procedure, but the target word was a nonword printed in color, which the subject was to name. The experimenters hypothesized that this task would help determine whether or not context effects were due to a general tendency to read the last word of a sentence.

The results from these two tasks indicated that the greater use of context by younger and poorer readers that was found in Task I was the result of the speed of automatic word recognition processes of good readers. It was not due to the use of semantic redundancies found in context. West and Stanovich concluded that with increasing reading skill and fluency, automatic word recognition processes dominate performance. Word recognition is so fast in skilled reading that the effect of context is lessened. In short, reliance on context does not increase with either age or reading ability.

In all, the studies in this section present conflicting evidence as to the use of semantic context clues made by skilled readers. It appears that both skilled and less-skilled readers are able to make use of meaning clues found in connected text. However, there exists the possibility that less-skilled readers rely on such clues as the main aid to word recognition because they are deficient in word recognition skills (Schvaneveldt et al, 1977; West and Stanovich, 1978).

Syntactic Context Effects and the Skilled Reader. The results of previously cited studies (Goodman, 1965; Klein and Klein, 1973; Tweedy et al, 1977; and Wisher, 1976) indicated that, in general, semantic and/or syntactic contextual cues can and do aid word recognition. However, Goodman (1967) and Smith (1971) both feel that the skilled reader is a better user of context than the less skilled reader. In the previous section on semantic cue useage and the skilled reader, results of the Schvaneveldt et al (1977) and West and Stanovich (1978) gave evidence that this might not be the case. In this section, the use of syntactic cues by skilled and less skilled readers is discussed.

Weaver and Henry (1978) developed a study to determine if there were qualitative as well as quantitative differences in the syntactic errors made by skilled and less-skilled readers in the third grade. Reader group placement was determined by the score achieved on a standardized reading survey test. In this study a cloze procedure was used in which subjects were to fill in words missing from a story with another word which would make sense. Responses were coded as: 1) no error, 2) correct form class error (CFC), 3) incorrect form class error (IFC), or 4) no response. When the CFC and IFC error types were analyzed, it was found that: a) poor readers, overall, made more errors than good readers; b) that both good and poor readers made more CFC than IFC errors; c) that the same number of CFC errors were made by both groups; and d) that poor readers made significantly more IFC errors than did good readers. The authors concluded that poor readers are either less sensitive to, or less able to use syntactic information than good readers. However, the results of several other studies have led to different conclusions.

Weber (1970) examined the oral reading errors made by good and poor first grade readers for grammatical appropriateness. An error was grammatically acceptable if it did not alter the previous context. Overall, the errors made by both groups of readers were gramatically consistent with the preceeding text (92% for good readers; 89% for poor). Weber also analyzed the good and poor reader's self-corrections of word errors. Good readers corrected 85% of the grammatically unacceptable errors while poor readers corrected only 42% of such errors. Weber concluded that poor first grade readers do not differ from good readers

with respect to the use of grammatical constraints for the identification of words in context.

Allington (1978) also examined the effects of syntax on word recognition accuracy as well as on reading rate. Fourth graders were grouped according to the score achieved on a reading mastery test. Skilled readers had a mean reading grade equivalent of 4.9 while the poor readers had a mean of 2.8. Subjects orally read a story first presented in its original format, and then read in random word-order strings. Allington found that poor readers needed the aid of syntax and relied on it for word recognition accuracy. However, they did not rely on syntax for rate, as rate remained consistent in both conditions of format. On the other hand, the good readers were able to maintain accurate word recognition under both conditions, though it was found that syntax significantly aided their fluency (rate).

Guthrie (1973b) investigated the use of syntactic cues by good and poor readers in a silent reading task. Three groups of elementary school students were used. One group (mean age 9.99 years) was classified as disabled readers and had a reading level of 2.54 on a standardized test of reading vocabulary. The second group consisted of young normal readers (mean age 7.42 years) who were matched to the disabled group on age and I.Q. The third group consisted of normal old readers who were matched with the disabled group also on chronological age and I.Q. All subjects read a cloze passage where every fifth word had been replaced by a slot with three word alternatives of three types: 1) the correct word, 2) a syntactic alternative which was of the same form class as the correct word but which altered the meaning of the

sentence, and 3) a lexical alternative that was of a different form class than the correct word but which was semantically compatible with the context of the passage. In the analysis of data, Guthrie found that poor readers selected fewer correct alternatives. However, no significant differences were found among the three groups as to the types of errors made. Guthrie concluded, like Weber (1970), that disabled readers do not differ qualitatively from good readers in their use of syntactic cues during silent reading.

Coomber (1973) investigated syntactic processing in a study of oral reading errors using proficient, average, and deficient readers in the third grade. Reader group placement was determined by using two measures: 1) performance on the comprehension and vocabulary subtest of a standardized measure of reading achievement; and 2) the teacher's estimate of each student's reading ability. Coomber controlled the reading materials for vocabulary and syntactic difficulty to hold the error quantity factor constant so that he could consider syntactic competency without the effect of word recognition difficulty. All subjects read several graded passages until their word error rate became excessive. Errors were measured for syntactic appropriateness by determining whether or not they fit the context from the beginning of the sentence through the point at which the error occurred. Coomber found no significant differences between the three groups of readers, and that the errors of all groups showed a tendency to be grammatically appropriate. Coomber concluded that readers at all levels were sensitive to syntactic sentence structure.

Biemiller (1970) analyzed the oral reading errors made by first grade children over a period of eight months. He hypothesized that

there were three stages of reading progress. In the first stage, the predonderence of errors would be syntactically appropriate, showing that the reader was relying on contextual constraints. Biemiller felt that children in this stage were not able to make maximum use of graphic information, and therefore not really learning to read. He found, at the end of the study, that children who remained in this stage all year, or who left it only at the end of the year, were the readers making the least progress.

The results of the Weber (1970), Guthrie (1973), Allington (1977), Coomber (1973), and Biemiller (1970) studies indicate that readers of all ability levels were sensitive to syntactic cues provided by context and made syntactically acceptable word substitutions. Biemiller (1970), and Allington (1977) found evidence, in fact, that less-skilled readers relied on syntax for word identification. Biemiller believes that this reliance is due to the fact that less-skilled readers have not developed the skills needed to make use of the graphic information. Weaver and Henry's (1978) study may have reached a different conclusion because they used a cloze procedure to measure this variable.

Skilled Readers and the Use of Graphic Information. As previously stated, Sherman (1979) feels that a healthy reader uses all three language cue systems effectively during an oral reading, fluent texting performance. The grapho-phono cue system of language is used during the word recognition process where the reader attends to letters, spelling patterns, and letter-sound correspondences as an aid to pronunciation.

However, Goodman (1967) and Smith (1971) contend that skilled readers use less of the visual information provided by text than do

less-skilled readers. In other words, they feel that skilled readers are relying on the syntactic and semantic systems to guide their reading, and in short, can ignore the grapho-phono cues. During oral reading, then, according to Goodman (1967) and Smith (1971), less skilled readers are nonfluent because unlike skilled readers, they are not relying on the syntactic and semantic cues. Instead, they are attending to the graphic cues to the extent that fluency and comprehension are sacrificed.

Empirical evidence exists that demonstrates that skilled readers are both faster and more accurate on noncontextual word recognition tasks (Perfetti and Hogaboam, 1975; Hogaboam and Perfetti, 1977; Golinkoff and Rosinski, 1976; all previously cited). However, the ecological validity of these studies was questioned because the goal of reading instruction is not to produce readers who fluently read lists of words, but readers who read connected text fluently and meaningfully.

The Biemiller study (1970, previously cited), included an investigation of readers' use of graphic information during an oral reading task. In that study graphic information was information about single letters and letters in sequence. In analyzing oral reading substitution errors made by first graders, the reader was thought to be using graphic information if the written form of the response approximated to some degree the written form of the stimulus word. After two and a half months of observation, Biemiller found that the readers who made the most progress had come to rely more on the graphic cues or words, and less on the syntactic contextual cues.

Weber (1970, previously cited) came to the same conclusions as Biemiller in the linguistic analysis of oral reading errors made by

first graders. She found that when each word substitution error was compared to the original stimulus for graphic similarity, the better readers approximated the correct response more closely than did the weaker readers. Like Biemiller (1970), she found that the weaker readers used a word identification strategy which relied more on contextual cues of the sentences than on the graphic information.

Coomber (1973, previously cited), also analyzed the graphic and phonetic appropriateness of oral reading errors made by Proficient, Average, and Deficient readers in the third grade. He, like Weber (1970) and Biemiller (1970), found that the better readers made errors which were more similar to the letter-sound pattern of the stimulus on long words. However, the differences between the three groups of readers did not reach statistical significance.

The empirical evidence of the Weber (1970), Biemiller (1970), and Coomber (1973) studies suggests that skilled readers make word errors which are graphically and phonetically more similar to the stimulus word than do less-skilled readers. These three studies, which seem to have the ecological validity lacking in the noncontextual word recognition studies, have resulted in evidence which demonstrates that skilled readers have knowledge about letter-sound relationships. When an unfamiliar word is encountered, they can apply this knowledge to produce a word that both looks and sounds like the stimulus. Since the poor or less-skilled readers in these studies could not do this as well, it doe not appear that they are relying on the skill for word recognition. In fact, it appears that this skill is deficient.

Semantic, Syntactic and Grapho-phono Cue Usage and the Skilled Reader. The final studies to be discussed concerning language cue

usage by skilled and less-skilled readers investigated the simultaneous use of all three systems.

Allington and Strange (1975) wished to determine the degree to which readers could use and integrate all three language cue systems. Second and fourth grade students were classified as good or poor readers according to the score on a standardized measure of reading achievement. The subjects read a sentence which was either poor, moderate, or rich in contextual clues, and which had a word deleted. Two words of high or low frequency, which were the target words to be generated by the readers, were kept out of the reader's view. The subjects were to read the sentence and think of a word that would fit. If they did not respond with the target word, they were shown its initial letter. If still incorrect in response, successive trials were done, each giving more letter cues. This procedure was repeated until the student generated the correct word. The analysis of data indicated that both groups of students were able to utilize graphic, syntactic and semantic cues. However, good readers were able to integrate the cues better than the poor readers, and used the graphic cues to better advantage than the poor readers.

Juel (1980) also compared the word identification strategies of skilled and less-skilled readers to determine if skilled readers were more "text-driven" or "concept-driven" when reading than less-skilled readers. By text-driven, Juel meant that word identification was achieved by either systematically decoding words using letter-sound correspondences and spelling patternsn, or by instant recognition of sight words, rather than using mainly context clues. By concept-driven, she meant that contextual cue usage was the primary strategy for

correct word identification. Second and third graders were classified as either high or low ability readers according to: 1) their reading group placement in school, 2) a percentile score in overall reading achievement on a standardized achievement test, and 3) the grade level score on a graded word list. In the first session of the experiment, the subjects read 20 words in isolation, and 20 sentences which did not contain these words. One week later, subjects read another 20 words in isolation and 20 non-corresponding sentences. The word characteristics varied from being "easy decodable", one-syllable, high frequency words, to being "hard decodable", two syllable, low frequency words. The experimenter predicted that the decodability of the words and their frequency would affect pronunciation errors. The results indicated that frequency significantly affected pronunciation errors in all context conditions, with high frequency, easy decodable words being easier to recognize. Juel also found low frequency, hard decodable words caused more errors regardless of contextual level. Context did not appear to significantly decrease decoding activities. It appears that high ability readers could identify low frequency words better than poor readers, either due to a better sight vocabulary or better intra-word decoding ability. Juel concluded:

> as readers become more skilled, they read in a predominately text-driven fashion. This is not to say that good readers never use context, but that their use of it is primarily limited to cases where internal word characteristics offer minimal cues for identification.[6]

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[6]Connie Juel, "Comparison of Word Identification Strategies with Varying Context, Word Type, and Reader Skill," Reading Research Quarterly, 15 (1980),p. 375.

The results of these two studies (Allington and Strange, 1977, and Juel, 1980) indicate that skilled readers take word recognition cues from the graphics of the text when they encounter unknown words. They have knowledge of letter-sound relationships and can use them when needed. In short, they do not appear to be guessing their way through a text.

Rate. The previous information in this chapter dealt with both contextual and noncontextual word recognition abilities of skilled and less-skilled readers. The noncontextual presentation allowed the reader to rely on the grapho-phono language cues (spelling patterns), while the contextual mode allowed for linguistic evaluation of word substitution errors to determine their syntactic and semantic appropriateness.

Oral reading of contextual material also provides the basis for insights into the fluent texting variable of rate. In this study, rate was measured as the number of words read per minute during oral contextual reading. Although measured as a number count, it was not just a measure of speed. Instead, rate was considered to be a variable of fluent texting which can affect, or be affected by other reading performances. In other words, a slow rate may impair a fluent oral rendition, but it may also impair comprehension. Its cause, however, can be attributed to poor use of language cues, or a slow rate can perhaps be the result of deficiencies in word recognition (sight and decoded) abilities. In Sherman's Model of Reading and Learning, rate is not one of the skill effectors of fluent texting behavior. However, if a reader "overlays" language onto a text, the performance should approximate a typical speaking rate.

Carnine and Silbert (1979) discuss the interactive nature of rate to other reading performances. They begin by relating rate to fluency in oral reading:

> Students read fluently when their rate approximates their speaking rate and also when they group words into phrases with appropriate inflection.[7]

Included in the category of appropriate inflection are the intonation clues of juncture, pitch and stress. Reading with expression, which to Carnine and Silbert is also a demonstration of the student's comprehension of the text, includes pausing at punctuation marks, emphasizing the appropriate words, and using vocal inflections which reflect mood. Besides being related to fluency and intonation, Carnine and Silbert feel that rate is directly related to word decoding abilities. To them, students read slowly and nonfluently because they have little knowledge or ability to use word identification strategies. Slow decoding causes a word-by-word style of reading, which in the end, impairs comprehension.

Gough (1972), in a discussion of the relationship between reading rate and reading connected text, related slow rate to deficiencies in both word decoding and comprehension abilities. He maintained that word mispronunciations were due to guessing on the part of the reader because he lacked sufficient knowledge and use of the orthographic structure (spelling patterns) of words.

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[7]Douglas Carnine and Jerry Silbert, Direct Instruction Reading. (Ohio: Charles E. Merrill, 1979), p. 231.

Concerning the relationship of rate to comprehension, Gough states:

> If it takes too long to read a given word, the content of the immediately preceding words will have been lost from the primary memory, and comprehension will be prevented.[8]

Karlsen (1969) shares a point of view similar to that of Carnine and Silbert (1979) and Gough (1972) in proposing that reading rate is related to decoding deficiencies. Word decoding disability, then, affects general reading achievement. Karlsen explains:

> reading rate becomes a significant bit of information if viewed not just as a measure of speed but as a measure of decoding efficiency. Some children can decode practically every book put in front of them, but at a rate so slow as to make the reading deficient... extremely laborious reading, even if mostly correct, is generally symptomatic of a reading deficiency.[9]

Biemiller (1977-78) also feels that reading rate is related to overall reading achievement. He explains:

> if reading is a slow and arduous process, both simple time demands and competing activities may keep the slow reader from reading sufficient amounts of materials to meet educational needs.[10]

Biemiller (1977-78) investigated the relationship between oral reading rate for letters, words and simple text, to reading achievement. During

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[8]Philip B. Gough, "One Second of Reading," Language by Ear and by Eye, eds. J. F. Kavanagh and I.G. Mattingly (Massachusetts: The MIT Press, 1972), p. 532.

[9]Bjorn Karlsen, "Reading: Assessment and Diagnosis of Abilities," The Evaluation of Children's Reading Achievement, ed. T. C. Barrett (Newark: International Reading Association, 1967), p. 178.

[10]Andrew Biemiller, "Relationships Between Oral Reading Rates for Letters, Words, and Simple Text in Development of Reading Achievement," Reading Research Quarterly, 13 (1977-78), p. 226.

a six year study, students were timed at specified intervals while reading passages. The reading rates were compared to standardized reading test scores, and correlations were found between reading rate for letters, words and text, and general reading achievement. Overall, he found that in good readers there appeared to be an underlying ability to verbally identify print items quickly, regardless of context and word structure. Poorer readers, overall, had slower response times to all print items.

Brown (1982) assumes that rate is a part of reading fluency, and that fluency can affect other reading performances. According to Brown, fluent reading "sounds like talk written down." Fluency and rate are more than related, he explains. They are in fact interrelated in that rate is built on a "foundation of fluency." He goes on then to relate reading fluency to reading comprehension, and like Carnine and Silbert (1979) to intonation patterns:

> Fluency in reading signals that communication has come and that reading has become more than word-solving...Fluent reading communicates better, it sounds more interesting, and the ideas of the author are easier to follow than when the same words are read by a nonfluent reader.[11]

Lesgold and Curtis (1981) agree with Karlsen (1967), Gough (1972), and Carnine and Silbert (1979) concerning the relationship of rate to word recognition. In the discussion of results of a study of second, third, and fourth grade children, Lesgold states that high and average readers, from the time of initial reading instruction, read at a much faster rate than did low ability readers. They feel that there is one

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[11]D. A. Brown, Reading Diagnosis and Remediation (New Jersey: Prentice-Hall, Inc., 1982), p. 268.

skill which good and average readers have that accounts for the rate difference: specific word recognition skills which are integrated with other language cues already possessed. According to Lesgold and Curtis (1981), poor readers, on the other hand:

> show less transfer between learning to read one word and learning to read another. Thus, their progress in acquiring the enabling skill is slow and incremental.[12]

Smith (1982), on the subject of reading rate, states that "reading must be fast." By this, he means that the reader must not become bogged down in the visual details (graphics) of the text by focusing on a few letters at a time or a single word. Such word-by-word reading, according to Smith (1982) and Carnine and Silbert (1979), results in impaired comprehension. By reading below a certain rate, the memory system is unable to retain, organize and/or store bits of information efficiently. Smith feels that skilled readers are able to read faster because they pick up "chunks" of information (such as whole phrases) in a single eye fixation. Additional information which contributes to a rapid rate, comes from sources found in the redundancies inherent in semantic and syntactic language cues.

Patberg and Yonas (1978) used skilled and less-skilled readers in the eighth grade as well as a group of skilled adult readers to investigate how information in peripheral vision affects comprehension. Like Smith (1971, 1982), Patberg and Yonas felt that if skilled readers had a larger perceptual span than less-skilled readers, and could take in more (chunks) of visual information, then, by depriving them of the

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[12]Alan M. Lesgold and Mary E. Curtis, "Learning to Read Words Efficiently," Interactive Processes in Reading, eds. A. Lesgold and C. Perfetti (New Jersey: Lawrence Erlbaum, 1981), p. 352.

availability of the additional information, their reading speed and comprehension could be impaired. In other words, by forcing skilled readers to read in a word-by-word fashion similar to that of less-skilled readers, Patberg and Yonas could evaluate the role of the perceptual span size in fluent reading. In the experiment, subjects read text which had either regular spacing between words, or 13 spaces between them. The four passages also varied in difficulty. Following the readings, subjects answered 10 questions about each for a measure of comprehension. "Reading efficiency" for each subject was determined by combining a reading speed score (rate) and a comprehension score. Patberg and Yonas found that overall, comprehension scores for all three groups of readers were higher on the easier passages. However, for the less-skilled readers in the eighth grade, the widely-spaced text had two opposing effects: it increased comprehension but decreased rate. In other words, the less-skilled readers read the widely spaced text in a word-by-word fashion, but their comprehension of it was better than in the regularly spaced mode. The experimenters felt that this could possibly be due to the fact that the widely spaced mode slowed them enough so that they could attend to each word instead of skipping it. Another possible explanation given is that poor readers, in general, need more time in which to process incoming information. In contrast to what was found with the poor readers, the comprehension scores of the skilled adult and eighth grade readers did not differ in either mode of presentation, though their rate was significantly slower in the widely spaced mode.

Juel and Holmes (1981) investigated the oral and silent reading of sentences by skilled and less-skilled readers to see if word-by-word

reading did impair comprehension. The subjects, second and fifth grade students, were classified as either high or low ability readers according to: 1) a word recognition subtest score, and 2) a grade level score on an informal reading inventory. The subjects read sentences which varied in terms of word decodability (regularity of phonic pattern), word frequency, number of syllables in words, and semantic difficulty. To obtain a rate score, each subject was timed while reading the sentences one at a time, both orally and silently. Comprehension was measured by having the subject select a picture which best represented the meaning of the sentence just read. In analyzing the data for rate, the times for the good readers in both the silent and oral reading mode were about the same. Poor readers read the sentences which contained two-syllable, hard decodable, low-frequency words more slowly in the oral mode. However, though their rate was slower, their comprehension was not significantly different than in the silent mode. Juel and Holmes felt, that overall, good readers have learned to use mediating strategies for word identification, and can comprehend well in both oral and silent reading modes. On the other hand, poor readers do not apply mediating strategies as well in the oral mode and decrease its use in the silent mode. In both modes, their comprehension is poor. Juel and Holmes concluded:

> It does not appear that the added attention expended on achieving oral pronunciation results in less time spent on on sentence comprehension. Rather, it appears to simply increase poor readers' overall processing time in oral reading.[13]

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[13]Connie Juel and Betty Holmes, "Oral and Silent Reading of Sentences," Reading Research Quarterly, 16 (1981), p. 560.

The results of the Patberg and Yonas (1978) and the Juel and Holmes (1981) studies provide evidence that word-by-word reading is not the sole cause of poor reading comprehension.

Goodman (1967), like Smith (1971), feels that fluent readers use language cue redundancies to make predictions (guesses) about forthcoming words and information. Also like Smith (1982), Goodman feels that in fluent reading, the graphic cues need only be sampled. He states: "As the child develops reading skill and speed, he uses increasingly fewer graphic cues." [14] To Goodman, reading involves the use of sampling, predicting, and guessing processes, which to him are higher level thought processes (top-down). Following Goodman's line of reasoning, reading is a faster and more fluent task when guided by "inside the head" processes, rather than by the graphic information on the page.

Mitchell and Green (1978) tested the Goodman (1967) proposition that states that readers are "hypotheses testers." They reasoned that if readers are testing hypotheses, reading speed should increase toward the end of the sentence where predictability is the greatest. Subjects presented passages to themselves on an on-line visual display so they could self-pace three word phrases of text. A button was pressed each time more text was needed. The time between button presses served as an index of processing difficulty. Mitchell and Green found that greater semantic and/or syntactic predictability in sentences did not lead to increases in reading rate. Instead, word frequency and word length appeared to be the factors which effected rate. They concluded that

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[14] Kenneth S. Goodman, "Reading: A Psycholinguistic Guessing Game," Journal of the Reading Specialist, 16 (1967), p. 504.

hypotheses could not be generated and tested fast enough to actually facilitate on-going word recognition, as Goodman (1967) proposed. However, in a post hoc analysis of data, they found that semantically selective verbs did have a tendency to facilitate word recognition. Since this finding was contrary to their belief that hypotheses testing is too slow a process to aid word recognition, they chose to find fault with studies which did find that context aided word identification, rather than do further investigation at that time.

Although the theorists and educators discussed above feel, like Sherman (1979), that rate is interrelated or related to one or more of the other reading performances, little information or research exists on an "optimal" reading rate. Carnine and Silbert (1979) recommended a minimal words-per-minute rate of 150 words (orally) for grades 4, 5, and 6. They based this number on the research of Taylor, Frackenpohl, and Pettee (1960), as well as on their own experience with children. Taylor et al (1970) specify a rate of 158 words for fourth grade, 173 for fifth, and 185 for sixth.

Karlsen (1969) feels that by the end of third grade, oral and silent reading rate coincide, and is close to 140 words-per-minute. At fourth grade the oral rate levels but the silent rate increases about 15 words-per-minute each year up to junior high school. From then on, Karlsen explains, the increase becomes about 10 words per year, finally reaching about 250 words-per-minute for adults.

Smith and Holmes (1971) and Biemiller (1977-78) feel that a silent rate of around 200 words-per-minute is necessary. Brown (1982) feels that fluent oral reading seldom exceeds 200 words-per-minute, and averages about 150 words-per-minute.

Integration of Language into Oral Reading: Attention to Punctuation. One relatively uninvestigated aspect of the visual information presented on the printed page is punctuation. Recently, linguists have acknowledged the part it plays in reading as a representation of something done in spoken language. Walcutt, Lamport, and McCracken (1974) feel that punctuation is interrelated with sentence rhythm, syntax, and meaning. During oral reading, the use of punctuation helps the listener ascertain whether or not the author's message is being understood by the reader, for misuses of punctuation can result in a message quite different from what an author intended. According to Walcutt et al, in both fluent speaking and fluent oral reading, full stops are not made at the ends of sentences. Rather, the speaker or reader goes from the last word in one sentence to the first word in the next with no measurable pause. In spite of this phenomenon, the listener is able to tell that a sentence has ended because of the variation in rhythm and sound of the speaking voice. In other words, a pause is implied by the intonation patterns of spoken language.

> There are syntax-thought rhythms involved with punctuation which reveal and embody the nature of the English sentence. They are always felt, if not always heard.[15]

Dechant (1982), like Walcutt et al, feels that punctuation is a means of facilitating meaning, and that it represents the intonation patterns of juncture, pitch, and stress in speech. Similarly, Anderson (1957), Cook (1959), Furness (1960) feel that punctuation is related to vocal intonation and meaning.

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[15]Charles Walcutt, J. Lamport and G. McCracken, Teaching Reading: A Phonics-Linguistic Approach to Developmental Reading. (New York: MacMillan, 1974), p. 276.

Moffett and Wagner (1979) state that in reading the task is to match graphic symbols with voice qualities. For instance, they feel that pitch and pause should be matched to commas and periods. Unlike Walcutt et al, however, they do not equate punctuation with grammar or syntax. Instead,they see punctuation as a reflection of it. They state:

> Punctuation is a set of signals showing the reader how to read the flow of words as a speaker would say them ... the features of intonation are especially important cues to meaning.[16]

The only piece of research found which included the use of punctuation was done by Hood (1975-76) in an evaluation of oral reading and inter-judge reliability. Second graders, who were average readers, were used as subjects in the study. The omission, substitution, and insertion of punctuation marks were considered during oral reading analysis. Punctuation errors were defined as the difference between the expected intonation and that exhibited by the reader. Five trained judges evaluated the subjects' oral readings for several types of word and punctuation errors. In the analysis of data, Hood found a low reliability between judges because they could not agree whether a difference occurred. Hood concluded that due to the subjectivity involved in scoring, punctuation errors should not be included in the analysis of oral reading errors.

In combining the information provided by the several authors mentioned above, it appears that there is a consensus concerning the relationship between punctuation and intonation, and punctuation and

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[16]James Moffett and B. Wagner, Student-Centered Language Arts and Reading, K-13 (2d ed., Boston: Houghton Mifflin Co., 1976) p. 236.

meaning during oral reading. However, as Hood (1975-76) points out, measuring the correct usage of punctuation during analysis of oral reading is difficult due to the subjectivity involved.

Self-Corrected and Total Number of Word Miscues. The last two variables under investigation in this study, the number of self-corrected word miscues and the total number of miscues made, will be discussed jointly as they were combined in most of the research and literature on oral reading analysis.

Goodman (1965) studied the oral reading errors of children in the first, second, and third grade. Part of the study was an investigation of the "regressions" or repetitions of single words or phrases made. He included this aspect of oral reading because at that time, many studies of eye movements in good and poor readers were being done which hypothesized that poor readers needed training in how to move their eyes while reading. When Goodman (1965) analyzed the oral reading patterns of his subjects, he found that: "virtually every regression which the children in this study made was for the purpose of correcting previous reading."[17] Goodman (1965) concluded that regressions were not signs of a reading problem but, rather, were signs that readers were using the semantic system of language to help them gain meaning. In short, regressions were the means by which children correct themselves and learn. He also found that there were two reasons why errors were not corrected: 1) the error was semantically acceptable and did not alter the meaning of the passage, or 2) the reader was over-relying on

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[17]Kenneth S. Goodman, "A Linguistic Study of Cues and Miscues in Reading," Elementary English, 42 (1965), p. 642.

analytic techniques (letter-sound relationships) within words, and therefore lost the meaning of the passage.

Goodman (1965) felt that the self-correcting behavior exhibited in readers was a sign that they were learning to read, and were gaining meaning from their reading. But a question comes to mind: Is self-correction behavior a characteristic of good readers?

Goodman (1969) in a similar study of self-correction behavior and semantic acceptability of oral reading errors, concluded:

> the greater the proportion of miscues spontaneously corrected, the greater the pupils' reading maturity. Too much dependence upon word analysis techniques actually results in a decrease of self-corrections.[18]

In other words, Goodman (1969) felt that good readers self-correct word mispronunciations more often than poor readers do. He equated this self-correcting behavior with the fact that good readers were "reading for meaning" and, therefore, such behavior in word miscues was not a cause for concern. Once again, he warned against instructing children using a program that stressed letter-sound relationships.

Clay (1968) investigated the oral reading errors of beginning readers who were instructed using a method in which words were taught in context. No instruction in the use of letter-sound relationships was given this group of subjects. One of the variables under examination was self-correction behavior and its relationship to the grammatical acceptability of oral reading word errors. Using an end of the year reading achievement test, the readers were divided into four groups:

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[18]Kenneth S. Goodman, "Analysis of Oral Reading Miscuse: Applied Psycholinguistics," Reading Research Quarterly, 5 (1969), p. 22.

high, high middle, low middle, and low. Clay (1968) found that during oral reading, the median reader in the high group made one error in approximately every 37 words read, while the median reader in the low group made one error in approximately every two and one-half words read. Not only did the high readers make fewer word errors, they corrected one in every three to four, while the low readers corrected one in every 20 word errors. Like Goodman (1965, 1969) Clay felt that the group of high readers made better use of syntactic and semantic language cues as aids to word identification than did the poor readers, and that this affected self-correction behavior. Conversely though, her other findings did not support Goodman's proposition that poor readers over-relied on the graphic cues in words. She found that the low readers used less graphic cues in words. She found that the low readers used less graphic information which in turn made them rely more on the semantic and syntactic constraints of sentences as aids to word identification. The type of reading instruction her subjects were receiving was the type Goodman (1965, 1969) would endorse because it emphasized the use of contextual cues as the major strategy for word recognition. Since her subjects did not receive instruction in the use of graphic cues, they would not be expected to either know or use this strategy. Therefore it is not surprising that the low readers did not. What is surprising is that the high readers displayed knowledge of graphic cues in words, and made use of this knowledge during oral reading.

Cohen (1974-75) investigated the oral reading patterns of first grade children who, in contrast to the children in the Clay (1968) study, were receiving reading instruction based on a program which emphasized the use of graphic cues (letter-sound relationships) for word

identification. She examined word substitutions and their grammatical acceptability, as well as self-correction behaviors. Over an eight month period of time, subjects were ranked monthly according to the number of correct words achieved during oral reading sessions. Subjects were classified as good readers if their monthly number of correct words consistently fell within the first quartile. Poor readers were those whose monthly number of correct words consistently fell within the last quartile. Cohen (1974-75) found that all reader groups, at the beginning of the study, rarely self-corrected word miscues. However, over the eight month period of time, she found that there was a substantial increase in self-correction behavior for good readers, and little increase for poor readers. Contrary to Goodman (1965; 1969), she felt that this pattern of self-correction resulted because good readers were able to use graphic cues as well as contextual cues to better advantage than poor readers.

In the studies discussed so far, the number and types of word errors made, and self-correction behaviors were examined in terms of reader maturity and proficiency. In the next group of studies, these variables, and their relationship to comprehension, were examined.

As early as 1937, Fairbanks, during a study of eye movements and word errors in good and poor comprehenders at the college freshman level, found that not only did poor comprehenders make more word recognition errors than did good comprehenders, the errors were linguistically different. Fairbanks (1937) found that 51 percent of the word substitution errors made by the poor comprehenders distorted the meaning of the passage, while none of the errors made by the good comprehenders did so. He also found that good comprehenders corrected their word errors 19

percent of the time as compared to a 7 percent correction rate for the poor comprehenders. In other words, good comprehenders made fewer word mistakes, and corrected more of these than did poor comprehenders.

Steiner, Wiener, and Cromer (1971), in their previously cited study on comprehension training and word identification for poor and good comprehenders in the fifth grade, also investigated errors which were spontaneously corrected by the subjects as well as uncorrected errors. To control for error rate, the corrected errors were scored as the number of corrected errors over the total number of errors (which was the number of initial errors minus the corrected errors). They found that the good comprehenders were able to go back and spontaneously correct many of their initial word errors. They concluded that: "good readers often noted an incongruity between what they said and what they already understood in a text."[19]

Weber (1970) investigated the oral reading errors of two first grade classes in terms of syntactically appropriate miscues made. Also investigated was the readers' corrections of word mispronunciations. These miscues were evaluated as to how well they corresponded to preceding context. The subjects were classified as either good or poor comprehenders. She found that both skilled and less skilled comprehenders made syntactically acceptable word miscues approximately 90 percent of the time. She also found that good comprehenders usually did not correct 73 percent of word miscues which fit the sentence structure and did not alter the meaning. However, they corrected 85 percent of

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[19]Rollin Steiner, Martin Wiener, and Ward Cromer, "Comprehension Learning and Identification of Poor and Good Readers," Journal of Educational Psychology, Vol. 26, #6, December 1971. p. 511.

word errors which distorted the sentence meaning. Poor comprehenders, on the other hand, did not correct 68 percent of their syntactically and semantically acceptable miscues, while they corrected only 42 percent of the ones that distorted sentence meaning. In other words, good comprehenders self-corrected approximately twice as many word errors which altered sentence meaning as did the poor comprehenders.

Kendall and Hood (1978) investigated the relationship between comprehension and word recognition through analysis or oral reading. The subjects were fifth grade disabled readers who differed on two dimensions. One group of readers received low scores on a comprehension test, but high scores on word recognition tests (LoC-HiWR). The second group of readers received high scores on a comprehension test, but low scores on word recognition tests (HiC-LoWR). Each subject orally read a third and fifth grade story and then was asked 10 literal comprehension questions. Several variables were analyzed including the proportion of errors that the subjects self-corrected while reading. Kendall and Hood (1978) found that the group of HiC-LoWR readers made significantly more word recognition errors than the group of LoC-HiWR readers, were not using contextual information as well, and were not self-correcting as many errors. They concluded that comprehension is closely tied to word recognition and to self-correction behavior.

Page (1979) explored oral reading error correction behavior in all levels of readers in grades two, three, four, and six. He used three behaviors for which percentage scores were obtained. These included: 1) successful corrections (SC), 2) unsuccessful corrections (UC), and 3) no corrections (NC). He felt that these measures would provide a limited description of what was happening in correction

behavior, so he reported these percentages in ratio relationships with one another. Four more variables were then included for the study. These were: 1) the percent of successful corrections divided by the percent of semantically unacceptable word miscues (RCB1), in which no correction attempt was made; 2) the percent of successful corrections divided by the percent of deviant responses with no correction attempt (RCB2); 3) the percent of successful corrections divided by the percent of deviant responses with no correction attempt, added to the percent of unusccessful correction attempts (RCB3); and 4) the percent of successful attempts divided by the percent of unsuccessful corrections (RCB4). The forty-eight subjects orally read a 250 word passage in its original format, and immediately reread it in a cloze format which was used as an indicator of comprehension ability. Page (1979) found that the ratios of the two measures of correction behavior (RCB1 and RCB2) were the best indicators of comprehension. Due to the exploratory nature and small sample size of the study, Page recommended that his findings be used as a basis for further investigation into correction behavior in oral reading and its relationship to comprehension.

In this section, Goodman (1965, 1969) interpreted his studies to mean that self-correction behavior was a positive sign that readers were maturing and reading for meaning. Clay (1968) and Cohen (1974-75), from their studies, concluded that different instructional methods for word recognition made little difference in the oral reading performances of good readers. Good readers made fewer word errors and self-corrected more of the syntactically and semantically unacceptable errors than did poor readers. Fairbanks (1937), Steiner et al, (1971) and Weber (1970) investigated the relationship of the total number of word errors and

self-correction behavior to comprehension ability. They found that good comprehenders exhibited the same performances as the good readers in the Clay (1968) and Cohen (1974-75) studies, and concluded there was a positive relationship between these variables and reading comprehension. Kendall and Hood (1978) found that comprehension ability was related not only to self-correction behavior, but also to word recognition skill. Finally, Page (1979) introduced the concept of using ratio scores in self-correction behavior. He concluded that certain types of ratio scores were better indicators of comprehension ability than were percentage scores.

Chapter Summary

In this chapter, the related literature and research studies which investigated the eight variables of proficient reading described in Sherman's Model of Reading and Learning (1979) were discussed. Such areas as word recognition skill and its relationship to comprehension, and use of the language cue systems of syntax and semantics and their relationship were presented. The variables of fluent texting, specifically rate and attention to punctuation, were found to lack related literature and research. On several of the variables, there was no consensus of opinion by researchers as to the value of measuring them.

The procedures used for implementing this study, and the instrumentation employed to measure the eight variables, are presented in the next chapter.

Chapter 3

DESIGN AND METHOD

INTRODUCTION

The central concern of this descriptive study was to investigate whether the four reading performances in Sherman's (1979) Model of Reading and Learning are descriptors of proficient reading behavior. Three groups of fourth grade students, classified as Proficient, Average, or Deficient readers according to a measure of reading comprehension, were individually tested on measures of:

1. sight word vocabulary (SW)
2. appropriate applied decoding behavior (WA3)
3. fluent texting variables which included:
    a. rate (R)
    b. attention to punctuation (PUNCT)
    c. syntactically acceptable word miscues (SYN)
    d. semantically acceptable word miscues (SEM)
    e. self-correction of word miscues (SC)

In addition to the seven variables listed above, it was necessary to measure an eighth variable in order to arrive at the ratio scores on the measures of syntactically and semantically acceptable word miscues (TM) made during the fluent texting oral reading performance. This variable was also used as a between group measure.

Subjects

The target population under consideration in this study consisted of 83 fourth graders in their eighth month of fourth grade. All resided in a lower-middle to middle class neighborhood in a suburb of Lansing, Michigan. All attended a neighborhood elementary school and were in regular classrooms.

Fourth graders seemed to be the best choice of subjects for this study because it is at this time that instruction in most subskill components of reading decreases, and readers are expected to apply reading skills to content area material. In other words, reading becomes a tool for learning new information. Students are required to read texts for information, and as ultimate proof of comprehension and learning, they are to answer related questions. This identical task is required on standardized measures of reading comprehension. Due to the similar nature of the task, as well as to the assumed interactive relationship between the performances defined in the Model of Reading and Learning (Sherman, 1979), the score achieved on a reading comprehension task became the criterion of reader-group placement.

The following sampling procedures was used to select the sample for this study.

1. All subjects in the target population (N-83) were given the Gates-MacGinitie Reading Test, Level D, Form 1, comprehension subtest (Houghton-Mifflin, 1978). The classroom teachers administered this test one week prior to when the study was scheduled to begin.

2. The tests were checked and graded by the researcher, and then rechecked by a trained assistant in order to minimize possible

scoring errors. The raw score and corresponding grade equivalent score became the criterion for placement into one of three readers groups: Proficient, Average, or Deficient. Group placement was determined in the following manner:

a. Subjects who achieved raw scores of 24 to 39, which corresponded to grade equivalent (G.E.) scores ranging from 5.3 to 11.7, were placed in Stratum I, and labeled Proficient readers. (N_1 = 38)

b. Subjects who achieved raw scores from 21 to 23, which corresponded to grade equivalent (G.E.) scores ranging from 4.5 to 5.1, were placed in Stratum II and labeled Average readers. (N_2 = 17)

c. Subjects who achieved raw scores from 9 to 20, which corresponded to grade equivalent (G.E.) scores ranging from less than 2.4 to 4.3, were placed in Stratum III and labeled Deficient readers. (N_3 = 28)

3. Due to the extensive amount of time needed to individually test children on several variables, it was necessary to limit the sample size to a workable number. After the three strata were formed, 12 subjects were selected from each by a simple random sampling procedure, resulting in a total sample size of 36 (n=36). The average age for this sample was nine years, nine months. Twenty-one females and 15 males participated. In each group there were 7 females and 5 males respectively. Since gender was not felt to be a critical factor influencing reading achievement, it was not used as a variable in this study.

TABLE 3-1

SUMMARY OF STRATIFICATION RESULTS

STRATUM I Proficient Readers R.S: 24-39 G.E. 5.3 - 11.7	STRATUM II Average Readers R.S: 21-23 G.E: 4.0 - 5.1	STRATUM III Deficient Readers R.S: 9-20 G.E: 2.4 - 4.3
$N_1 = 38$	$N_2 = 17$	$N_3 = 28$
$n_1 = 12$	$n_2 = 12$	$n_3 = 12$

Reading Comprehension Criterion Instrument

The Gates-MacGinitie Reading Test, Level D, Form 1, Comprehension subtest, was chosen as the instrument for reader group placement for the following reasons:

1. The test is designed for fourth, fifth, and sixth graders, removing to some extent a possible "ceiling" effect for the more able readers.

2. Normative scores are provided for the comprehension subtest.

3. Content of the comprehension passages reflect a proportionate sampling of items from the content areas of natural science, social science, and humanities, as well as narrative prose. This sampling of material is representative of what is typically read by fourth grade students in school.

4. Both literal and inferential questions are used to sample the understanding of passages.

5. Approximately twice the number of items needed for this test were developed for a national tryout and from this, only items of appropriate test item difficulty and usefulness were kept.

6. Although the tests are timed tests, in the May, 1978 standardization, 89% of the fourth graders marked the next to the last item on the comprehension test for Level D, allowing all but the very slowest readers to finish.

Procedures for Individual Testing

Due to the nature of this study, which involved testing all 36 subjects individually in three reading performance areas, a research assistant was needed. Two hours of training in data collection and scoring procedures were given.

To eliminate any preconceived notion concerning a subject's reading ability, the names of the 36 subjects in the sample were put on index cards which did not indicate group placement. The cards were then shuffled and each researcher randomly selected 18 students for testing.

To keep each testing session as standard as possible, the directions for the battery of tests were typed out and read to each student. (See Appendix B)

The individual testing took place at the elementary school attended by the subjects. Each researcher was provided with a private room. All sessions were tape recorded in their entirety, and followed the procedure listed:

1. At the beginning of each session, the researchers explained what the study was about, and gave an overview of what the subject was expected to do.

2. Once the subject appeared to be relaxed, the three reading performances were measured in the following sequence:

    a. appropriate sight vocabulary (S.W.)

b. appropriate applied decoding behavior (W.A.3)

c. Fluent texting behaviors

Instrumentation for Individual Testing

Since no single commercially developed, standardized test was available which defined and measured all three reading performances in the same manner as that defined in this study, it was necessary to make the following decisions:

1. Appropriate sight vocabulary measure (SW): To measure the number of words a reader can pronounce instantly when presented with a visual stimulus, the Slosson Oral Reading Test (Bobbs-Merrill Company, 1963) was used. There is little information on the norm groups for this test, as the manual's only mention of validity is a .96 correlation with the Standardized Oral Reading Paragraphs by William S. Gray. In spite of this lack of statistical information the S.O.R.T. was chosen for the reasons listed below:

a. It is designed to be used as a screening device which samples the reader's store of sight words. This design fit the intention of this study.

b. The S.O.R.T. contains 200 words equally divided into ten graded lists, ranging from the primer to high school level in reading difficulty. These words are frequently used in most school reading texts, and therefore represent words most students have previously encountered.

c. The words are presented in list format. Therefore, the reader has no contextual sentence clues to aid word recognition. Instead, he must generate the pronunciation using only memory and/or letter cues.

The administration procedure consisted of telling the subject to begin reading the words on the primer list, and to pronounce as many of the entire 200 words as possible. To discourage the use of word analysis skills, each word was allowed to be viewed for no longer than 3 seconds. At the end of this time limit, the subject was told to go on to the next word. When a word was pronounced correctly within the time limit, it was marked with a "+", and the subject received a point for it. If mispronounced, or pronounced after the time limit, it was marked with a "-" and no credit was given. Also, no credit was given if the subject first mispronounced the word, and then self-corrected it.

The raw score for this test was computed by counting all the +'s which were then converted into grade equivalent scores according to the table provided with the test. Upon completion, the test was scored immediately, as the grade equivalent score indicated to the researcher which oral reading passage to administer first during the fluent texting measure.

2. Appropriate applied decoding behavior (WA3): To measure the reader's knowledge and application of letter-sound relationships of the English spelling system as an aid to word identification, two instruments were employed:

a. The Gates-McKillop Reading Diagnostic Test: Recognizing and Blending Common Word Parts (Teacher's College Press, 1962). This test consists of a list of 23 one and two syllable nonsense words. The manual lacks descriptions of normative samples and studies, as well as reliability data. In spite of this lack of information, the test was selected for the following reasons:

1) N. Dale Bryant, in the Sixth Mental Measurement Yearbook (1965), stated that this subtest is particularly valuable for analyzing component reading skills in the areas of consonant blends, consonant digraphs, and vowel phonograms. It requires that the subject produce sound from visual symbols, a task that matches the reading act.

2) Being that the words are regularly spelled nonsense words, the subjects are forced to apply word analysis skills as an aid for pronunciation, for there is no possibility that such words could be in his sight vocabulary.

The Recognizing and Blending Common Word Parts subtest, in its original form, consists of four columns. In the first column, the entire nonsense word is presented for pronunciation. The second column is a list of the initial consonant clusters (blends) separated from the stimulus word, while the third column is a list of vowel phonograms separated from the stimulus. The fourth column once again presents the entire stimulus word. (Example: spack__ sp__ ack___ spack____.) The original directions allow the subject to pronounce the stimulus word, and if correct, proceed to the next word in the first column. If mispronounced, the subject then proceeds to the second column, pronounces the consonant cluster, then to the third to pronounce the vowel phonogram, and finally, the entire stimulus word again in the fourth column. No time limitation is imposed.

In this study, the subject viewed only the stimulus word in column one and attempted pronunciation. No time limit was imposed. Only initial correct attempts were counted toward the

raw score. These were marked with a "+". Possible scores ranged from 0 to 23.

The subject was then given the second measure of decoding behavior.

b. The Botel Reading Inventory, Phonics Mastery Test, Nonsense Words subtest (Follett Publishing Company, 1961). As with the previous measures, the manual for this list of 15 multisyllabic nonsense words, contained neither normative nor reliability and validity data. It was selected for use in this study for the following reasons:

1) Ira E. Aaron, in the Seventh Mental Measurements Yearbook (1972) stated that for children who are above grade-three reading achievement, this nonsense words subtest adequately samples several phonics (letter-sound) skills. It goes beyond the skills tested in the Gates-McKillop subtest discussed in "a" above by testing skill application using multisyllabic words. This is a more sophisticated task, as the reader must not only apply letter-sound skills, but must visually segment the word into proper syllabic units for proper pronunciation. (Example: "Calcumvent" must be segmented as cal-cum-vent for proper pronunciation.)

2) The words are regularly spelled nonsense words which forces the subject to use word analysis skills as the means for pronunciation. As with the Gates-McKillop Recognizing and Blending Common Word Parts subtest, there is no way that the subject could have such words in his sight vocabulary.

The original directions were used, which required that the subject pronounce all 15 words without a time limitation. Words pronounced correctly on the initial attempt were marked with a "+". A raw score count of all correctly pronounced words was calculated, and had a possible range of 0 to 15. This was then added to the raw score achieved on the Gates-McKillop Recognizing and Blending Common Word Parts subtest to arrive at the total score for the performance sign of appropriate applied decoding behavior (WA3).

The subject then proceeded to the measures for the next performance sign, fluent texting behavior.

3. Fluent Texting Behavior: As stated in Chapter 1, an adequate performance in this sign is one in which the reader sounds as though he were speaking during an oral reading task. Since this would be difficult to measure due to subjectivity, it was necessary to define five descriptive variables which are assumed to contribute to a fluent oral reading performance, plus a sixth variable which would be used both for group comparisons and as a number to arrive at the percentage scores needed on two fluent texting variables. Since no standardized measures of these variables exist, the ones decided on were previously investigated as single factors which influence good reading.

For all measurements in the performance sign of fluent texting, five passages were used which were selected from the basal reading series published by Harcourt, Brace, and Jovanovich (1979). This is not the same reading series as used in the school attended by the subjects. The specific difficulty indices for the passages

were computed using the Extended Fry Readibility Formula (1978). The reading levels given by this formula were: second, third, fourth, fifth and sixth grade. The passage lengths were between 105 and 141 words. Each passage was typed on a 5" x 7" card, and all five were read by each subject. The first passage administered corresponded to the grade equivalent score achieved by the subject on the Slosson Oral Reading Test, the instrument used to measure the first performance sign of appropriate sight vocabulary. This was done so that the subject would not be initially confronted with too difficult a passage which might frustrate and discourage him. Table 3-2 shows how the initial passage administration was determined. The remaining four passages were shuffled and administered in random order.

TABLE 3-2

INITIAL ORAL READING PASSAGE ADMINISTRATION

Slosson Oral Reading Test Grade Equivalent Score	Fluent Contextual Reading First Passage to Administer
2.0 to 2.9	Passage #2(second grade)
3.0 to 3.9	Passage #3(third grade)
4.0 to 4.9	Passage #4(fourth grade)
5.0 to 5.9	Passage #5(fifth grade)
6.0 and above	Passage #6(sixth grade)

The nature of this oral reading task was explained to each subject according to the directions found in Appendix B.

The following descriptive variables of fluent texting were assessed as stated below:

a. Rate (R): The oral reading of each passage was timed using a stop watch, and an average words-per-minute count was computed. This count was determined by dividing the number of words per passage by the number of seconds and then multiplying by 60. (Example: words-per-minute x 60 equals words-per-minute reading rate.)

b. Attention to punctuation (PUNCT): The number of commas, periods, hyphens, and question marks correctly attended to for each passage, was counted. This number was placed over the total number of punctuation marks that occurred in each passage, and computed as a percentage score.

c. Semantically acceptable word miscues (SEM): This performance was measured by examining each mispronounced word in all five passages to see if the subject replaced the original one with a synonym. A synonym is semantically acceptable because it does not alter the meaning of the sentence or text. For example, if a subject read the stimulus sentence "The dog chased the cat" as "The dog chased the kitty", the meaning of the sentence, which is that a dog chased a feline, is not changed. Therefore, the word substitution would be counted as a semantically acceptable word miscue.

The number of this type of word miscue made, divided by the total number of miscues (TM; see 4 below), resulted in a ratio score for each subject.

d. Syntactically acceptable word miscues (SYN): This performance was measured by examining each mispronounced word in all five passages to see if the original word was replaced with a word of the same part of speech. For example, if the sentence "The dog chased the cat" was read as "The dog chased the cow", the subject substituted a noun for another noun. This miscue altered the meaning, but did not alter the grammatical class of the word. Therefore, this miscue would be considered a syntactically acceptable word miscue.

The number of this type of word miscue made, divided by the total number of word miscues (TM; see 4 below), resulted in a ratio score for each subject.

e. Self-correction behavior (SC): During the oral reading of the five graded passages, the number of times word miscues were spontaneously self-corrected by the reader was counted. Raw scores served as the basis for analysis.

4. Total number of word miscues (TM): This count of all word miscues made in all five passages during oral reading was needed for between group comparisons, and for use in arriving at the ratio scores for semantically and syntactically acceptable word miscues. The following types of miscues were included in this count:

a. All semantically acceptable word miscues

b. All syntactically acceptable word miscues

c. Word reversals (was- saw)

d. Replacement of the stimulus word with a nonword. (Note: Omissions, repetitions, and changes in inflected word endings were not counted as errors.)

Analyses

To control for the overall Type I error rate, the multivariate analysis of variance (MANOVA) was used to test the null hypothesis of no differences among the three groups of readers on the eight variables. This procedure is designed to take into account the probability that significant difference may be found simply because multiple numbers of hypotheses were tested using each dependent variable separately. Although other methods for controlling the overall Type I error rates are available, the multivariate approach is more powerful. An alpha level of .05 was used to test the hypothesis.

Univariate analyses of variance were performed to locate the variables which accounted for the finding of significant differences during the MANOVA. These variables were then examined using Tukey's post hoc procedure to compare pairs of means. Alpha levels of .05 were used for these analyses.

Finally, a bivariate correlational analysis of the data was performed to determine the extent of the relationship between the variables as well as their relationship to the independent variable of reading comprehension.

Summary

In this chapter, the procedure for data collection, test administration and scoring was presented. The types of analyses which were used to examine the data were also discussed.

In the next chapter, the results of the data analyses are presented as well as discussion of the findings.

Chapter 4

RESULTS AND DISCUSSION

INTRODUCTION

The central concern of this study was to determine if the four performance signs described in Sherman's (1979) Model of Reading and Learning (MORAL) were those exhibited by proficient readers and differentiated them from average and deficient readers.

Fourth graders were tested on a group measure of reading comprehension and placed into either the Proficient, Average, or Deficient reader group according to the grade level score achieved. All subjects were then individually tested on measures of:

1. appropriate sight word vocabulary (SW)
2. appropriate applied decoding behavior (WA3)
3. the fluent texting variables of:
    a. rate (R)
    b. attention to punctuation (PUNCT)
    c. semantically acceptable word miscues (SEM)
    d. syntactically acceptable word miscues (SYN)
    3. self-correction behavior (SC)
4. Total number of word miscues made during the oral reading performance (TM).

Group mean scores were then compared to test the hypothesis. Further analyses of the data were done in order to locate areas of specific group differences, and differences between pairs of group

means. A final analysis was done to determine the extent to which the eight variables were related to one another, as well as to reading comprehension.

The data analytical results and discussion are reported in the following order:

1. The results of the hypothesis testing;
2. The results of the univariate analysis of the dependent variables;
3. The results of the post hoc comparisons of pairs of group means;
4. The results of the bivariate correlational analysis.

Hypothesis Testing

To test the null hypothesis which stated that there would be no differences between the mean group scores of the three groups of readers, a multivariate analysis of variance (MANOVA) was performed. The advantage of using a multivariate test of the null hypothesis is to control for the overall Type I error rate. And it is more powerful than testing hypotheses on each variables separately.

The likelihood ratio statistic for the multivariate test on the eight variables was 0.30675. This corresponded to an F-statistic of 2.6180, which had an approximate F-distribution with 16 and 52 degrees of freedom under the null hypothesis of no differences between groups. Using this approximate distribution, the nominal level of significance was found to be 0.0046. Thus, the null hypothesis of no differences was rejected at the 0.05 level of significance.

Univariate Analysis

To determine specific between-group differences, a univariate analysis of variance was employed. This inferential "ex post facto" technique made it possible to determine whether the three sample means for each variable were significantly different from one another. The following assumptions concerning the criterion scores underlie this procedure: 1) they are statistically independent due to random selection of subjects, 2) they are drawn from populations having the same variance, 3) they are drawn from a normally distributed population, and 4) the samples are of equal size.

The univariate one-way analysis of variance resulted in an F value which was the ratio of between-groups variance to within-groups variance. This calculation made it possible to determine whether the between-groups variance was significantly greater than the within-groups variance. An alpha level of .05 was used.

The results of this analysis of data are presented in Table 4-1.

No significant differences were found between reader groups on the two fluent texting variables of syntactically acceptable word miscues (SYN) and self-correction behavior (SC).

Two explanations are offered for the lack of significance between groups in the area of syntactically acceptable word miscues. The first is that no real difference exists between reader groups of varying ability. All groups are equally sensitive to, and make use of the syntactic cues provided by context. Although this contradicts the proposition held by Goodman (1967) and Smith (1971) who stated that skilled readers made better use of the syntactic cues provided by context, it supports the research findings of Weber,1970; Biemiller, 1970;

Table 4-1

Results of the Univariate Analysis of Group Means on the Eight Dependent Variables

Dependent Variables	Means/Standard Deviations			Mean Squared Within	$F_{2,33}$
	Proficient Group I	Average Group II	Deficient Group III		
SW	143.42 / 23.50	106.75 / 28.85	92.92 / 34.67	862.37	9.48*
WA3	25.75 / 7.58	17.25 / 9.89	15.08 / 10.00	85.13	4.48*
R	124.70 / 24.97	100.23 / 20.51	82.62 / 24.91	555.13	9.66*
PUNCT	95.43 / 5.26	87.20 / 9.29	84.82 / 10.40	74.29	5.00*
SEM	27.79 / 11.65	11.75 / 9.75	11.86 / 11.68	122.55	8.34*
SYN	37.34 / 17.96	30.99 / 17.19	35.30 / 14.62	277.47	0.455
SC	27.57 / 22.61	24.53 / 14.97	25.34 / 18.17	355.25	0.08
TM	11.67 / 9.04	28.50 / 18.77	50.33 / 43.94	787.77	5.73*

SW -- Sight Words
WA3 -- Appropriate Applied Decoding Behavior
R -- Rate
PUNCT -- Attention to Punctuation
SEM -- Semantically Acceptable Word Miscues
SYN -- Syntactically Acceptable Word Miscues
SC -- Self Correcting Behavior
TM -- Total Number Miscues

*Significant at the .05 level

Coomber, 1973; Allington, 1978; and Guthrie, 1973, who found no significant between group difference.

The second explanation is that the measure of this variable was not operationalized correctly. In the present study, as in the ones mentioned above, readers of varying ability read graded passages during which their total number of word miscues was counted. These miscues were then analyzed for syntactic acceptability. Only one study reviewed (Weaver and Henry, 1978) resulted in the finding of significant difference between groups on this variable. A cloze format was used in which readers had to insert the correct word. However, since in actual reading textual materials are not printed in such a format, this procedure appeared to lack ecological validity.

The second variable that did not result in a significant difference was that of self-correction behavior. On this measure, all reader group means were approximately equal. Readers in all groups spontaneously self-corrected about one-fourth of their miscues during the oral reading of graded passages (See Table 4-1).

It is possible that in reality no difference exists in this behavior when groups of varying ability are compared. However, Goodman (1965 - 69), Clay (1968), Cohen (1974-75), Fairbanks (1937), Weber (1970), and Steiner et al, (1971) found that good readers self-corrected more miscues than did poor readers. Their studies, however, measured this variable differently than what was done in the present study. In the other studies a qualitative linguistic analysis of miscues was included. The type of word miscue was first determined to be either syntactically or semantically inappropriate. Then a count was made to see how many of either type of miscue was spontaneously self-corrected by readers

of different abilities. By using a ratio score and a qualitative linguistic analysis of the total number of miscues corrected the results might have been different and more in agreement with previous research findings.

Significant differences were found between reader group means on the following six variables:

1. appropriate sight word vocabulary (SW)
2. appropriate applied decoding behavior (WA3)
3. the three fluent texting variables of:
    a. rate (R)
    b. attention to punctuation (PUNCT)
    c. semantically acceptable word miscues (SEM)
4. total number of miscues made during oral reading (TM).

Although significant differences were found on several variables, it was still not possible to find where the specific between group differences were. Therefore, further investigation was needed in which pairs of group means could be compared on the variables which reached the level of significance. Hence, a post hoc comparison was employed next.

Tukey's Honestly Significant Difference (HSD)

Tukey's post hoc procedure was used to compare pairs of group means. This procedure is designed for making multiple comparisons, and takes into account the probability that significant differences between means may be found simply because many comparisons are made on the same data. Tukey's HSD was selected because of its suitability for making all simple pairwise comparisons among means when samples are of equal size. The HSD makes use of the studentized range statistic, the

distribution of which is a function of the maximum difference between two means. Pairs of reader group means for each of the variables found to be significant in the univariate procedure were compared in the following manner:

$$M_1 = M_2 \quad M_1 = M_3 \quad M_2 = M_3$$

An alpha level of .05 was used.

The results of this comparison are presented in Table 4-2.

Comparison of Pairs of Means between Groups II and III. In the post hoc analysis no significant differences were found between pairs of means between Groups II and III (Average versus Deficient) readers. From this data, it appears that no significant differences exist beween the groups of Average and Deficient readers.

Several explanations are offered for this finding, some of which are intuitive. First of all, it is possible, though unlikely, that no real difference exists betwene these two groups of readers on the variables under examination. Perhaps Average readers know more (as demonstrated by their slightly higher mean scores for some of the variables), but not enough more to achieve a level of significance during data analysis. However, their slight advantages in word recognition skill and rate might be enough to warrant them an Average group placement.

Another possibility is that during a reading comprehension task, the Average readers are better able to synthesize what they know than are the Deficient readers. Perhaps when reading task variables are measured individually this synthesizing ability cannot be determined.

Table 4-2

Results of Tukey's Post Hoc Comparison of

Pairs of Group Means

Dependent Variables	Studentized Range	Group I versus Group II	Group I versus Group III	Group II versus Group III
SW	29.58	36.67*	50.50*	13.83
WA3	9.30	8.50	10.67*	2.17
R	23.74	24.47*	42.08*	17.61
PUNCT	8.68	8.23	10.61*	2.38
SEM	11.15	16.04*	15.90*	-0.11
SYN	--	--	--	--
SC	--	--	--	--
TM	28.28	-16.83	-38.66*	-21.83

*Significant at the .05 level

SW -- Sight Words
WA3 -- Appropriate Applied Decoding Behavior
R -- Rate
PUNCT -- Attention to Punctuation
SEM -- Semantically Acceptable Word Miscues
SYN -- Syntactically Acceptable Word Miscues
SC -- Self Correcting Behavior
TM -- Total Number Miscues

However, in a task which requires them to integrate the subskills as in the comprehension task, they do better than the Deficient readers.

Reading comprehension, like comprehension in general, is influenced by the quantity and quality of real life experiences. It is also possible that the Average group of children in this study had broader and richer experiential backgrounds than those in the Deficient group. Therefore, they had more information to use or draw upon during the comprehension task, and thus gained a slight advantage.

The last explanation offered and the one which is most likely, is that the procedure used for group placement was not appropriate. Group placement was determined by a score achieved on a standardized measure of reading comprehension which was designed for students in grades four through six. The raw scores for placement into the Average group ranged from 21 to 23, while the score ranges for placement into the two other groups was much broader (See Table 3-1). Perhaps the use of an instrument developed specifically for fourth graders would have allowed a wider range of "average" scores. Support for this explanation was found in a study by Lesgold and Curtis (1981) who investigated rate in relationship to word recognition skills. They found that high and average readers differed significantly from the low ability readers. They had grouped their subjects according to a score on a reading achievement test which was developed for a specific grade level and allowed a wider range of scores for the average group.

Comparison of Pairs of Means between Groups I and II. When pairs of means for Groups I and II (Proficient versus Average) readers were compared, significant differences were found on the following three variables:

1. appropriate sight word vocabulary (SW)
2. the fluent texting variables of:
    a. rate (R)
    b. semantically acceptable word miscues (SEM).

The results of this analysis indicate that Proficient readers have significantly more words in their sight vocabulary, read at a faster rate, and make more miscues that do not change the meaning of the context than do Average readers.

Perhaps these are the differences which account for reader group placement within the classroom, and which were masked in the hypothesis testing when overall means were combined. It is difficult to interpret these findings in light of previous research because of the scarcity of studies which differentiated the Average readers from the Proficient. Most studies grouped readers dichotomously into a "skilled" group and a "less-skilled" group. Skilled readers were those who achieved a score on some measure of achievement that was at or above their grade level placement. Less-skilled readers were those who achieved a score below grade level. Since supportive research is lacking, only intuitive explanations can be offered at this time for these findings.

First of all, Average readers may be those children who best "fit" into the regular classroom reading program, which is typically structured around a basal reading series. The basal readers contain "grade level" prose and usually control vocabulary by having the teacher introduce new words prior to each lesson. Average readers are those students who have learned these programmed words as they progressed through the grades, and who may do little reading outside of their reading group at school. Limited only to grade level materials, and

perhaps lacking time, initiative or interest to go beyond what is presented, they maintain a steady incremental accumulation of words into their sight vocabulary. Perhaps this is the reason that they do not know as many words as the Proficient readers.

Proficient readers had a mean rate of approximately 140 words-per-minute which was significantly faster than the Average readers whose rate was approximately 107 words-per-minute (See Table 4-1). The rate of the Average readers was below the 150 words-per-minute rate suggested by Carnine and Silbert (1979), who felt that rate was related to oral reading fluency, reading comprehension, and word recognition skill. Karlsen (1969) also proposed that a slow rate was related to word recognition deficiencies and that by fourth grade the oral rate should be close to 140 words-per-minute. Although the Average readers in the present study read at a slower rate than what was proposed by these authors, they were able to achieve scores on the reading comprehension test that were within a three month range of their grade level placement. Perhaps a faster rate would have allowed them to achieve a better score. However, the comprehension test was read silently so valid inferences concerning oral rate and comprehension skill are difficult to derive.

The Proficient readers in this study made more semantically acceptable word miscues than the Average group of readers during the oral reading of graded passages. Once again, authors of previous studies found differences between skilled and less-skilled readers on this variable (Samuels et al, 1976-77; Isakon, 1979), but included the Average readers with the Proficient in the skilled group.

Further explanations concerning the differences between Proficient and Average readers are discussed in the last analysis of data (Bivariate correlation).

Comparison of Pairs of Means between Groups I and III. When pairs of means for Groups I and III (Proficient versus Deficient) readers were compared, significant differences were found on the following six variables:

2. appropriate sight word vocabulary (SW)
2. appropriate applied decoding behavior (WA3)
3. rate (R)
4. attention to punctuation (PUNCT)
5. semantically acceptable word miscues (SEM)
6. total number of word miscues (TM)

Two of the variables found to differentiate these two reader groups measured specific word recognition skills. Proficient readers know more words at sight (SW) and appropriately apply more knowledge of letter-sound relationships (WA3) as an aid to word identification than do Deficient readers. Goodman (1967) and Smith (1971) proposed that less-skilled readers over-relied on the graphic cues within words (letters, spelling patterns, letter-sound relationships). This over-reliance, they continued, negatively affected reading comprehension. If less-skilled readers do over-rely on such cues, it is reasonable to assume that these word recognition skills would be well developed. The findings of this study do not support that proposition. Instead, they are in consonance with conclusions reached by Perfetti and Hogaboam (1975), Hogaboam and Perfetti (1977), and Golinkoff and

Rosinski (1976) that readers skilled in comprehension responded faster and more accurately to words read from lists.

On the fluent texting variables, Proficient readers differed significantly from Deficient readers in rate, semantically acceptable word miscues, and attention to punctuation. Like Sherman (1979), Goodman (1967) and Smith (1971) also proposed that skilled readers made better use of the syntactic and semantic cues provided by context. Support for part of this proposition was found. Proficient readers made significantly more semantically acceptable word miscues during the oral reading of graded passages than the Deficient readers. This finding is in agreement with those of West and Stanovich (1978) and Samuels et al, (1976-77) who found that skilled readers, who had significantly better word recognition skills, made significantly more word miscues which did not alter the sense of the sentence.

The average words-per-minute oral reading rate for the Deficient readers was approximately 93 words-per-minute while that for the Proficient readers was approximately 140 words-per-minute. Several previously mentioned authors related a slow rate to word recognition and comprehension deficiencies (Carnine and Silbert, 1979; Karlsen, 1969). The findings of this study lend some support to their theories.

As seen in Table 4-2, Proficient readers correctly attended to significantly more punctuation signals than the Deficient readers. Though several authors felt that punctuation and meaning were related (Walcutt et al, 1975; Anderson, 1957; Cook, 1959; Furness, 1960) specific research studies on this variable are lacking.

Further discussion of group differences is included in the discussion of the last analysis of data using bivariate correlations.

Bivariate Correlational Analysis

A final analysis of the data was done to determine the extent to which each variable was related to another. The Pearson Product Moment procedure was used because the assumption was made that the relationship between two variables was a linear one. An alpha level of .05 was used. The results of this analysis are presented in Table 4-3.

The correlations for each variable are discussed according to the reading performance category of Sherman's Model of Reading and Learning into which they fit. Besides their relationship to one another, their relationship to the independent variable, reading comprehension, is also discussed. Further discussion of reader group differences is included.

Appropriate sight word vocabulary and appropriate applied decoding behavior. In Sherman's (1979) Model of Reading and Learning which is under investigation in this study, two of the reading performances measured were specific word recognition skills. Real words were read from lists to measure appropriate sight word vocabulary (SW) and nonsense words were read from lists to measure appropriate applied decoding behavior (WA3). The degree of signficant positive relationship between these two variables (+.868) indicated that they are related and that as one increases, so does the other. The correlation found between sight word vocabulary and reading comprehension (+.661) indicates that a positive significant relationship exists. In Tukey's post hoc comparison of pairs of means, significnat differences on sight word vocabulary (SW) were found between Groups I and II (Proficient versus Average readers), and between Groups I and III (Proficient versus Deficient readers). The extent of the relationship between the two word

Table 4-3

Results of the Bivariate Correlational Analysis Using the Eight Dependent Variables and the Independent Variable of Reading Comprehension

Dependent Variables	COM	SW	WA3	R	PUNCT	SEM	SYN	SC
SW	.661*							
WA3	.554*	.868*						
R	.707*	.822*	.643*					
PUNCT	.462*	.486*	.382*	.248				
SEM	.510*	.320	.248	.234	.302			
SYN	.091	-.060	-.068	-.118	.073	.572*		
SC	.017	.133	.075	-.131	.362	.035	.256	
TM	-.598*	-.827*	-.652*	-.776*	-.301	-.326	-.086	-.229

SW -- Sight Words
WA3 -- Appropriate Applied Decoding Behavior
R -- Rate
PUNCT -- Attention to Punctuation
SEM -- Semantically Acceptable Word Miscues
SYN -- Syntactically Acceptable Word Miscues
SC -- Self Correcting Behavior
COM -- Reading Comprehension
TM -- Total Number Miscues

*Significant at the .05 level

recognition variables, and in turn, the extent of their relationship to reading comprehension, suggest that word recognition ability is related to comprehension. This finding supports the conclusions reached by McCormick and Samuels (1979), Perfetti and Hogaboam (1975), Golinkoff and Rosinski (1976), and Hogaboam and Perfetti (1977).

The Variables of fluent texting. In Sherman's Model of Reading and Learning (1979), appropriate skill in word recognition was assumed to be necessary for a proficient performance in fluent texting behavior, which is an oral rendition of a text that sounds like speaking. If this were the case, the two word recognition variables (SW and WA3) should have a positive significant correlation with the fluent texting variables. As seen in Table 4-3, this was the case with rate (R) and attention to punctuation (PUNCT). Of all the variables measured, rate (R) had the highest positive relationship with reading comprehension (+.707) which was the independent variable and criterion for reader group placement. The extent to which the word recognition variables (SW and WA3) were related to rate (+.822 and +.643, respectively) and the extent to which rate in turn was related to comprehension (+.707) indicates that as one increases, so do the others. These findings support those of Biemiller (1977-78) and Lesgold and Curtis (1981) who concluded that deficiencies in word recognition slowed the oral reading rate of poor readers. The findings also support the proposition made by Gough (1972) who felt that a slow rate was related to deficiencies in word recognition which in turn, impaired reading comprehension. When the finding of significant differences between pairs of means between Groups I and II (Proficient versus Average readers), and Groups I and III (Proficient versus Deficient readers) is also

considered (see Table 4-2), more support for Gough's proposition is gained. Proficient comprehenders read significantly faster and knew significantly more words at sight than did Average and Deficient readers. Indeed, as Karlsen (1969) stated, rate appears to be more than a simple measure of speed. A slow rate may indicate that a deficiency exists in one or more of the related performance variables.

The other variable of fluent texting behavior that had a positive significant relationship to both comprehension (+.462) and to the word recognition variables, was that of attention to punctuation (PUNCT). No research was found concerning the relationship of punctuation to any of the variables under examination in this study. However, several authors (Dechant, 1982; Anderson, 1957; Cook, 1959; Furness, 1960; Walcutt et al, 1974) proposed that the misuse of punctuation signals could result in a message quite different from what an author intended. In the end, this could impair comprehension. Since pairs of means between Groups I and III (Proficient versus Deficient readers) were found to be significantly different on this variable in Tukey's post hoc comparison (see Table 4-2), support for this proposition was increased. Proficient readers correctly attend to more punctuation signals than do Deficient readers.

Another variable assumed to contribute to fluent texting behavior in this study was that of making semantically acceptable word miscues. However, the result of this analysis indicated that little relationship existed between it and three of the other fluent texting variables. This variable had low correlations with rate (+.234), attention to punctuation (+.302), and self-correction behavior (+.035). A significant positive relationship was found only with the variable of

syntactically acceptable word miscues (+.572), and with the independent variable of reading comprehension (+.510). During the post hoc comparison of pairs of means (see Table 4-2), Groups I and II (Proficient versus Average readers), and Groups I and III (Proficient versus Deficient readers), significant differences were found on semantically acceptable word miscues. Proficient comprehenders, during an oral reading task, made significantly more word substitutions that did not change the meaning of the sentence than did the Average and Deficient reader groups. The proposition has been made by Goodman (1967) and Smith (1971) that skilled readers made better use of the semantic cues provided by context. The findings of this analysis lend support to that proposition, and are in consonance with those of Steiner et al,(1971), Isakon (1979), Samuels et al,(1976-77), and Sherman (1979). Though included as a variable of fluent texting, the extent to which semantically acceptable word miscues correlates with the independent variable of reading comprehension (+.510) indicates that it might be a better measure of comprehension than of fluent texting behavior.

During the univariate analysis (see Table 4-1), no significant difference was found between reader groups on the variable of syntactically acceptable word miscues. Yet a significant positive correlation was found between it and the variable of semantically acceptable word miscues (+.572). Authors of previous studies who operationalized syntactically acceptable word miscues in the same way as was done in the present study also concluded that no significant difference existed between readers of varying ability (Weber, 1970; Biemiller, 1970; Coomber, 1973; Allington, 1978; and Guthrie, 1973). However, the extent

of the relationship between semantically and syntactically acceptable word miscues indicates that it might be artificial to measure these two variables separately. This appears to be a logical explanation, for in making a semantically acceptable word miscue, a synonymous word is substituted for the original one. By definition, a synonymous word is of the same grammatical class.

As seen in Table 4-3, self-correction behavior (SC) shows little relationship to any of the other variables under examination. As discussed in the univariate analysis, the way in which this variable was operationalized might have been inappropriate.

Total number of word miscues. The last variable that was investigated was that of the total number of word miscues (TM) made during the oral reading of graded passages. This variable was not included in any of the four reading performance categories in Sherman's Model of Reading and Learning (1979). It was simply a count of all miscues made during the oral reading of graded passages which was needed in order to derive the ratio scores for syntactically and semantically acceptable word miscues. As can be seen in Table 4-3, this variable was inversely related to the other variables, as well as to the independent variable of reading comprehension. Significant negative correlations were found between the total number of miscues (TM) and the two word recognition variables of appropriate sight word vocabulary (-.827) and appropriate applied decoding behavior (-.652). As skill in word recognition increases, even though measured by using lists of words, the total number of word miscues made during contextual reading decreases. Goodman (1967) and Smith (1971) criticized studies which related word recognition skills measured in this way to reading

comprehension. They felt that ecological validity was lacking, because in a reading task, words are embedded in the context of sentences. Yet, the extent of the correlations found between the two word recognition skills themselves (+.868) and that of each to reading comprehension (SW = +.661; WA3 = +.554) do suggest that a relationship exists. When words were embedded in context as in the oral reading of passages, the post hoc comparison of pairs of means showed that Proficient readers (Group I) significantly did better than Deficient readers (Group III) who made significantly more word miscues. It appears that Proficient fourth grade readers excell in word recognition skill whether it is measured contextually or not.

A significant negative correlation between the total number of miscues (TM) and rate (R) was also found (-.827). In Tukey's post hoc comparison of pairs of means, Group I (Proficient readers) differed significantly in rate from both the Average (Group II) and Deficient (Group III) readers. When the significant positive correlations between rate and the two word recognition variables are considered, it can be suggested that, once again, word identification skill is a factor that is necessary for a fluent oral rendition of a text.

A significant negative correlation was found between the total number of miscues (TM) and the independent variable of reading comprehension (-.598). Overall, it appears that making many word recognition errors detracts from all other measures of good reading.

To summarize, the extent to which the dependent variables correlate with one another and, in turn, the extent to which the correlate with reading comprehension, lends support to the assumption

that the performances in Sherman's (1979) Model of Reading and Learning are interactive in nature.

Chapter Summary

In this chapter, the results of the four analyses of data were presented, as well as the discussion of the findings. A summary of the study, the conclusions reached, implications, and recommendations for future research are presented in Chapter 5.

Chapter 5

SUMMARY AND CONCLUSIONS

Sherman's Model of Reading and Learning (1979) was examined and the reading behaviors of fourth grade students were compared in order to find whether four reading performances were descriptors of proficient reading. Thirty-six subjects were classified as either Proficient, Average, or Deficient readers according to the score achieved on a standardized measure of reading comprehension, one of the performances in the model under investigation. Individual tests were administered to the subjects to measure performance in appropriate sight word vocabulary, appropriate applied decoding behavior, and five variables of fluent texting behavior which included: 1) rate, 2) attention to punctuation, 3) semantically acceptable word miscues, 4) syntactically acceptable word miscues, and 4) self-correction behavior. An eighth variable, the total number of word miscues made during oral reading, was needed to compute ratio scores for two of the fluent texting variables.

Grade level equivalent scores in the performances, according to Sherman (1979), would demonstrate that the reader was capable of reading materials designed for his grade placement. However, since instrumentation was not available which converted raw scores to grade equivalent scores for several of the variables, raw scores were compared. Therefore, it was not possible to determine if the Average readers

who were at grade level in reading comprehension, were also at grade level in the other performances.

The results of the multivariate analysis (MANOVA) indicated that significant differences existed between the reader group mean scores. Therefore, the null hypothesis was not supported.

In order to locate group differences on each of the eight variables, a univariate analysis was done. Significant differences were found between the mean scores for all three reader groups on the following six variables:

1. appropriate sight word vocabulary
2. appropriate applied decoding behavior
3. the fluent texting variables of:
    a. rate
    b. attention to punctuation
    c. semantically acceptable word miscues
4. total number of word miscues

No significant difference was found between the mean scores in the area of syntactically acceptable word miscues or self-correction behavior.

When mean scores for Groups I and II (Proficient versus Average readers) were compared using Tukey's post hoc procedure, significant differences were found on the following three variables:

1. appropriate sight word vocabulary
2. the fluent texting variables of:
    a. rate
    b. semantically acceptable word miscues.

When mean scores for Groups I and III (Proficient versus Deficient readers) were compared, significant differences were found on the following six variables:

1. appropriate sight word vocabulary
2. appropriate applied decoding behavior
3. the fluent texting variables of:
    a. rate
    b. attention to punctuation
    c. semantically acceptable word miscues
4. total number of word miscues

When mean scores for Groups II and III (Average versus Deficient readers) were compared, no significant differences were found on any of the variables.

In conjunction, the results of the first three analyses of data indicated that Proficient readers know more words at sight, oral read at a faster rate, and make more word miscues that are semantically acceptable than the Average and Deficient readers. In addition, Proficient readers attended to more punctuation signals correctly, appropriately applied letter-sound relationship skill to word recognition better, and made significantly fewer miscues than did the Deficient readers. No significant differences were found between the Average and Deficient readers. Therefore, the following conclusion was reached:

Since proficient readers in fourth grade exhibited the four reading performances described in Sherman's Model of Reading and Learning (1979) to the extent that differentiated them from the

Average and Deficient readers, the performances can be considered reliable descriptors of proficient reading behavior.

Sherman (1979) stated that the nature of the relationship between the four performances defined in his model had not yet been established. It was still to be determined whether a deficiency in one affected only that performance, or if it also affected the others. A secondary intent of this study was to determine the nature of the relationship between the reading performance variables.

The finding of significant correlations, using the Pearson Produce Moment procedure, between appropriate sight word vocabulary, appropriate applied decoding behavior, rate, attention to punctuation, semantically acceptable word miscues, and in turn the significant correlations of each of these to reading comprehension, led to the following conclusion:

> The reading performance variables in Sherman's Model of Reading and Learning are interactive in nature. In other words, a deficiency in one is reflected by a deficiency in those to which it is significantly related. Reading is a complex process requiring mastery of several variables.

IMPLICATIONS AND RECOMMENDATIONS

A complete answer to the question "What do children need to know to become proficient readers?" remains a primary concern for educators, researchers and theorists. The transition of preliterate children from spoken language to its corresponding written form opens new avenues to learning. Unfortunately, learning through reading never becomes a reality for some children. The findings of this study, though based on

investigation of one interactive subskills model of reading, and restricted to fourth grade students grouped according to a measure of reading comprehension, suggest some implications for researchers, classroom teachers, and those who train teachers at the higher education level.

Implications and Recommendations for Researchers

There are sufficient indications from the present study that Sherman's Model of Reading and Learning (1979) warrants further investigation as both a diagnostic tool and as a performance based model of reading proficiency. Readers at grade levels other than fourth need to be evaluated in the four reading performance areas in order to locate patterns of proficiency or deficiency. It may be that children in the primary grades, who are beginning readers, will exhibit different patterns of reading behavior than those who have had several years of instruction. Is it possible for a first grader to achieve an oral reading rate of 140 words-per-minutes since he has had so little time to practice and integrate related performances? Will beginning readers exhibit appropriate applied decoding behavior? Even though this variable was a sign of proficient reading for fourth graders who scored above grade level in reading comprehension in this study, research in the field of psycholinguistics indicates that this may not be the case for beginning readers. Liberman, Shankweiler, Fischer, and Carter (1974) found that children cannot phonologically segment words or rhyme words until the age of six. Investigation into what beginning readers are developmentally capable of doing with sound-symbol relationships might provide instructional insights for primary classroom teachers.

Only by examining the reading performances of children at different grade levels will such patterns be revealed.

In this study, no significant differences were found between the Average and Deficient readers on any of the variables under investigation. Perhaps the use of a measure of reading comprehension developed specifically for fourth grade students would allow for a wider range of scores for the Average group, and may result in more appropriate group placement. This may then lead to the finding of differences between these two groups, or it may support the finding of no differences in this study. A recommendation for future research then would be a replication of this study using a different criterion measure for reader group placement. A replication of this study would also validate the findings of differences between the Proficient and Average readers, and the Proficient and Deficient readers. Do Proficient comprehenders really differ from Average and Deficient comprehenders in the performances of oral reading rate, appropriate sight word vocabulary, and semantically acceptable word miscues? In addition, do Proficient comprehenders really differ from Deficient ones in appropriate applied decoding behavior and attention to punctuation? Such questions deserve investigation.

One of the most important findings of this study which has research implications for investigation into proficient reading, was the finding of significant relationships between several of the dependent variables. The extent of these relationships demonstrates that reading is not a process which results from mastery of a unitary skill. Instead, it is a complex process requiring use and integration of the sound, syntactic, and semantic cue systems of language and their

corresponding visual representation. Goodman (1967) and Smith (1971) placed major emphasis on the use of syntactic and semantic context cues as the key to skilled reading, and ignored the importance of rapid and accurate word recognition. The results of this study, and those of Biemiller (1970), Perfetti and Hogaboam (1975), Hogaboam and Perfetti (1977), and Golinkoff and Roskiski (1977) suggest that rapid and accurate word recognition may be a crucial skill necessary for good reading comprehension. The extent to which word recognition skill (both instant and decoded) correlated to reading comprehension indicated a significant positive relationship. As one increased, so did the other. Furthermore, when group differences are considered, specifically in that Proficient comprehenders read significantly more words at sight than the Average and Deficient comprehenders, it appears once again, that word recognition skill is an important variable in proficient reading. Because of the interactiveness and the extent of relationship between the reading variables, research based on theories which ignore the importance of any of the language cue systems and their corresponding visual representations, may no longer be justified.

For this study, the performance of fluent texting behavior was difficult to operationalize due to the lack of a concise, measurable definition in the literature, and moreso, because of a lack of related research. In some cases fluent reading was synonymous with skilled reading where readers made rapid guesses about forthcoming words by using available context cues (Goodman, 1967; Smith, 1971). In other instances, it was defined as oral reading performed like "talk written down" (Brown, 1982). In this study, it was operationalized to include

several variables. One variable, the words-per-minute oral reading rate, had the highest positive relationship to the two word recognition variables, and to the independent variable of reading comprehension. Oral reading rate, then, appears to be as Karlsen (1969) proposed, more than a measure of speed. Further studies need to be done to support the findings of this one on this important variable. Such studies need to examine oral reading rate of readers at different achievement and grade levels to determine appropriate developmental rates, as well as to investigate its relationship to other reading performances.

Another fluent texting variable, attention to punctuation, was found to have a significant positive relationship to reading comprehension. Once again, related literature and research was scarce. Only one study investigated the reader's use of punctuation (Hood, 1975-76). Hood concluded that due to the subjectivity involved in scoring, punctuation errors should not be included in the analysis of an oral reading performance. Yet, in this study, the extent to which it correlated positively to reading comprehension indicates that it is related to meaning, as Moffett and Wagner (1979) and Dechant (1982) assumed. Also, when pairs of group means were compared, the Proficient comprehenders attended to significantly more punctuation signals than did the Deficient comprehenders. Studies which seek reasons for this finding might include such variables as perceptual span size for skilled and less-skilled readers, as done by Spring and Farmer (1975) and McLeod (1967). Or, researchers might turn to the work of McConkie and Rayner (1976) and Rayner, McConkie, and Erlich (1978) for suggestions about the use of cues available to the reader in peripheral vision. Studies which incorporate the perceptual span, and/or peripheral vision cue

usage, in addition to the performance variables measured in the present study, may add to the understanding of the relationship between punctuation, reading comprehension, rate, and word recognition.

Implications for Teachers

Gibson (1965) proposed that finding out what skilled readers have learned would provide insights into what children need to be taught in order to become proficient readers. Sherman (1979) built his Model of Reading and Learning on the premise that it was possible to find out what skilled readers have learned by observing what they do during reading tasks. By observing and measuring four ultimate reading performances, he proposed that it was also possible to detect the adequacy of underlying skill effectors. If the performance itself was adequate for reading grade level materials, this would signal that the subskills upon which it depends are also adequate. A less-than-adequate performance would, on the other hand, signal that perhaps one or more of the underlying subskills was deficient and further examination was necessary.

The four reading performances described in the Model of Reading and Learning (Sherman, 1979) incorporate the use of the sound, syntactic and semantic cue systems of oral language, as well as their visual representations. Two of the performances are word recognition skills, a third is fluent texting behavior, and the last is reading comprehension. The findings of the correlational analysis indicated that several of the reading variables under examination in this study are significantly related and therefore interactive in nature. That means that the quality of performance in one influences the performance in the

others to which it is related. The major implication of this finding for classroom teachers is that proficient reading will not develop through instruction in a unitary skill, such as phonics. Instruction and practice in all performances appear to be a necessary requisite for skilled reading at fourth grade level.

Teachers need also be aware of the finding of the differences between the three groups of readers. Proficient comprehenders know more words at sight, read at a faster oral rate, and make significantly more semantically acceptable word miscues than do Average and Deficient comprehenders. Keeping the interactive relationship between the variables in mind, it becomes evident that instruction and drill in word recognition will not be sufficient to decrease the extent of difference between reader groups. In this study, Proficient comprehenders made more semantically acceptable word miscues than the other two groups. This suggests that they have more words of related meaning in their mental lexicon which they can use as synonyms for stimulus words during contextual reading. This implies, that in conjunction with word recognition instruction and practice, vocabulary expansion is also warranted. To increase the number of words in the mental lexicon, the teacher needs to present as many words aurally as possible from sources outside the basal reader. Basals control vocabulary by limiting children's reading to grade level narrative prose.

The fluent texting variable of oral reading rate, besides differentiating the three groups of readers, has a significant positive relationship both with reading comprehension and with the two word recognition performances. To try to increase a reader's rate without recognizing its relationship to the other reading performances would

not be a sufficient instructional or remediation procedure (unless a slow rate was found to be nothing more than habit). From a correlational analysis, it is not possible to tell if rate is a symptom or a cause of deficiencies in related performances. However, the findings do suggest that oral reading analysis, during which the teacher or diagnostician computes a words-per-minute rate and evaluates word miscues linguistically, can be a powerful diagnostic technique. Such an analysis can provide insights into the adequacy of fluent texting behavior as well as adequacy of related performances.

Goodman (1967) and Smith (1971) proposed that less-skilled readers over-relied on the internal characteristics of words, such as letters, spelling patterns, and grapho-phono cues, and that this over-reliance impaired their reading comprehension. However, no support for the over-reliance on internal word characteristics by Deficient readers was found in this study. If less-skilled readers do indeed over use such skills, it would be reasonable to assume that when measured on it, they would demonstrate some degree of proficiency. This was not the case. Proficient comprehenders were able to decode significantly more single and multi-syllabic nonsense words than were Deficient comprehenders. Thus, it appears that when Goodman (1965) suggested that teachers abandon their concentration on words in the teaching of reading, he was not entirely correct. Teachers need to be aware that word recognition skill is a necessary factor in proficient reading, and should not abandon instruction in it. They must, however, remember that it is just one of several interrelated variables, none of which can be ignored during instruction.

Implications for Colleges of Education

It follows from the discussion above concerning implications for teachers, that the findings of this study would also have implications for those who train teachers.

The age-old controversy still exists between those who feel that reading instruction should focus on word recognition skill, and those who feel it should focus on the use of contextual cues (Samuels, 1980). Many of the educators and theorists who are on either side of this controversy, are also members of the faculty in colleges of education. Therefore, teacher candidates who come under their tutelage, receive training in reading instruction based on an extreme point of view. The findings of this study indicated that neither of the two opposing views are sufficient in themselves. Reading is a complex process which develops through the use and integration of the language cue systems of sound, syntax, and semantics, and their corresponding visual representation.

Sherman's Model of Reading and Learning (1979) defines four reading performances which described the behavior of proficient comprehenders in fourth grade in the present study. The extent to which these performances correlated one to another demonstrated that neither word recognition nor any of the language cue systems can be ignored. Therefore, those who instruct prospective teachers in how to teach children to read, must be aware of the nature of this interactive, complex process. Teacher candidates, given instruction in either a word recognition based approach, or in an approach which suggests that word recognition skill be ignored, will not have sufficient knowledge to enable them to meet the needs of children learning to read.

Therefore, Sherman's Model of Reading and Learning (1979) is suggested as a framework around which to organize a course in reading instruction. Prospective teachers need to learn how the theory behind the performance based model incorporates and balances the two extreme views of instruction. In addition, they must learn how the four performances operate interactively, each influenced by, and influencing the others. Also, they need to learn how the subskills (skill effectors) which underlie each performance, affect the total reading process. Using instrumentation similar to that employed in this study, teacher candidates can gain experience in diagnosing both performance and subskill proficiencies or deficiencies. Instruction in the use of oral reading analysis, including both a rate factor and a linguistic analysis of word miscues, will give them insights into the operation of related variables. One of the most positive qualities of the model is that the skills, performances, and learnings described in it can be applied to any reading program. At this time commercially developed basal reader series provide the core curriculum of reading instruction in public schools. By adding instruction in the use of the Model of Reading and Learning to the use of the basal, teacher candidates will be provided with knowledge that would help them create a balanced reading program.

Sherman's Model of Reading and Learning (1979) provides a logical bridge between Goodman (1967) and Smith's (1971) strong position that readers need only make use of the language cue systems of syntax and semantics and the strong position of those who feel that proficient reading results from instruction in word recognition skill (Fries, 1962; Bloomfield, 1933; Flesch, 1955).

APPENDICES

APPENDIX A

Sherman's Model of Reading and Learning

MODEL OF READING AND LEARNING

George B. Sherman, 1979. Michigan State University

VITAL SIGN	SKILL EFFECTORS	LEARNING EFFECTORS	UNIQUE CHILD EFFECTORS
I-A Appropriate Sight Vocabulary	I-B Word Perception Skills Discrimination Letter Sequencing Word Association Word Memory	I-C Quantity of Independent Contextual Reading Reinforcement, Feedback, Support, Attention, Meaningfulness	I-D Visual Acuity Language Proficiency Environmental Conditions Concept of Self as a Reader Motivation Expectations
II-A Appropriate Applied Decoding Behavior	II-B Sound Associations Consonants Multi Letter Consonants Multi Letter Vowels Phonograms and Transfers Segmentation of Multi-syllable Words Blending and Adjustment of Sounded Words	II-C Quantity of Independent Contextual Reading Sufficient for Acquisition, Generalization, and Transfer Reinforcement, Feedback, Support, Attention, Meaningfulness	II-D Auditory Acuity Language Proficiency Environmental Conditions Concept of Self as a Reader Motivation Expectations
III-A Fluent Texting Behavior	III-B Adequate Word Recognition At Sight and/or Analysis Attention to Internal/External Grammar Systems Attention to Internal/External Message Referents Integration of Skill Effectors	III-C Quantity of Independent Contextual Reading Meaningfulness Reinforcement Feedback, Support, Attention	III-D Language Proficiency Environmental Conditions Concept of Self as a Reader Motivation Expectations
IV-A Text Comprehension	IV-B Information Acquisition Attention Selection Conceptualization Inferencing Process Product	IV-C Psychological Set for Message Interaction	IV-D Language Proficiency Environmental Conditions Concept of Self as a Reader Motivation Expectations

INTRODUCTION TO READING DIAGNOSIS: A DIAGNOSTIC MODEL

--George B. Sherman
(Course Handout, Michigan State University, 1979.)

A good diagnosis is reliable, efficient, and generates appropriate treatment procedures. In order to meet these performance criteria, a diagnostician needs an information base that defines all the components of the structure being diagnosed; how each functions, and its relationship to all other components which it affects or is affected by. The more complex the structure the greater the potential for loss of reliability, efficiency and ultimate repair.

In order to diagnose and repair a car which may contain many thousands of individual component parts, a mechanic groups these parts into subsystems. A carburator isn't just a piece of the car, but rather is seen as an element in the fuel subsystem. In similar fashion he defines electrical systems, ignition systems, drive train systems, body systems, cooling systems, etc. Each system is a part of the whole car but contains its own components, adding its own function to the total car performance. Training a mechanic involves teaching the subsystem components; how each works, why each works, and what each contributes to the function of the subsystem. When a mechanic applies this information to repair a sick car, he observes the thump-thump or clunk-clunk that brought the car to his shop in the first place and rapidly categorizes subsystems that could produce such a dysfunction. Diagnosis continues, possible with the aid of schematics or shop manuals, until the component or components within a subsystem that are causing the problem are isolated and repaired.

This diagnostic-prescriptive model has long been applied to the treatment of reading disorders. Books have been written and courses taught on how to diagnose and repair a child's reading performance. The efficacy of this approach is questionable. Its reliability is low, its efficiency is unexamined, and its treatment outcome speculative. This doesn't mean that the concept of reading diagnosis is invalid; only that our ability to perform it well is highly suspect. While there are many explanations for this gap between theory and practice, a major one has to be a lack of analysis of "reading" into appropriate subsystems and their effecting components. There are many reasons for this.

A wise reading professor once described learning to read as the simultaneous acquisition of a specified set of skills and/or performances. His wisdom is apparent when we recognize that he left undefined the twin problems of what it is that is acquired and how it is acquired. That children learn to read is obvious. We can see them every day in any normal school classroom. But we are still plagued with the twin questions of what it is they learn (process) and how (effecting factors).

Attempts to define and answer the first question (what) have generated what educational historians will probably call the "decade of models." Theorists from such diverse fields as physical education, medicine, linguistics, and anthropology, as well as the more traditional interest areas of education and psychology have examined and defined the process of reading through the eye of their disciplines. The diversity of insight is enormous but fragmented; a unifying synthesis remains undefined.

The reading clinician is confronted by this bewildering array of theories, research, and experience without schematics or technical

manuals that could guide her diagnostic efforts. As a result, her efforts are usually unreliable, inefficient, and it doesn't matter anyway because she is going to teach him phonics!

Efforts to understand the second question--how a child learns to read--are directly tied to our problems in answering the first. Without a definition process, efforts to identify and understand the effecting factors remain unproductive.

A Model of Reading and Learning to Read

A map or schematic created to guide the clinician to a more reliable, efficient and valid diagnostic performance needs a number of basic qualities.

First, it must be both simple and concise. It should describe the process of reading and the factors which effect its learning using the smallest number of subsystems that will explain this very complex act. That is the purpose of subsystems: to isolate and define and clarify.

Second, it must be broad enough to allow the inclusion of a wide variety of "truths" that are contained in the literature of reading.

Third, it must fit the insights of experience. The clinician-teacher works with the real child, and a model must address this concrete reality.

Reading Subsystems: The Vital Signs

Reading is a complex act, but it is not infinitely complex. It has a limited number of subsystems and a good way to discover them is to simply ask the question, "What do good readers in first grade, third grade, sixth grade....know or perform that poor readers don't know or

can't perform?" Whatever statements this question generates should define what reading is in an applied sense.

I feel that there are four basic insight-performances that define this difference. I call these "signs," or the "vital signs" of reading. Each is necessary but not sufficient to describe reading as it is learned and performed by real children. Each identifies a subsystem of the total reading process. If they are valid, reading diagnosticians would use them as the basis for schematizing all the effecting factors which influence their acquisition or growth.

Sign #1

A healthy reader has a sight vocabulary adequate for grade placement or material demands.

Sign #2

A healthy reader has decoding insight and application appropriate to grade placement or material demands.

Sign #3

A healthy reader fluently integrates language (syntax and meaning) with written text.

Sign #4

A healthy reader can understand, think about, and remember whatever is read.

Any child who is healthy in all four signs is a reader. Any child who is deficient in one or more signs has a reading problem related to the sign and the size of the deficit. None of these signs tells why a child has them; only that he does. These four signs are analogous to the subsystems (ignition, drive train, electrical, etc.) as found in in an automobile. They can be observed to operate individually, or

they can interact with each other. Deficits in one can affect only that sign (system), or it can affect each of the other three.

Effecting Factors Within Signs

The other dimension to this model takes each sign and describes as many effecting factors that influence its acquisition as research, experience, and logic will allow. These effecting factors are grouped into three subcategories.

First: Effecting factors defined as subtask variables (skills).

Second: Effecting factors defined as learning variables (conditions).

Third: Effecting factors defined as unique child variables (basic givens).

Grouping signs with effecting factors produces the following matrix. (See figure 1.)

FIGURE #1

VITAL SIGNS	EFFECTING FACTORS		
	Task Variables	Learning Variables	Unique Child Variables
1. Sight Vocabulary			
2. Decoding Performance			
3. Fluent Texting			
4. Message Comprehension			

For purposes of this paper I will sketch in examples of potential effecting factors as they relate to Sign #1. (For completed 4 x 4, see page of this Appendix.)

SIGN	TASK VARIABLES	LEARNING VARIABLES	CHILD VARIABLES
Adequate sight vocabulary	A. Graphemic control, i.e. visual discrimination	A. Quantity of independent, contextual reading	A. Visual acuity
	B. Association and memory strategies	B. A is controlled by reinforcing and correcting feedback mechanism available during reading.	B. Language proficiency
		C. Meaningfulness of words being learned.	B. Environmental conditions

Conclusion

The model as described meets with a reasonable fit the three criteria previously described in this paper. It is concise, it is inclusive (both Goodman and Engleman can be placed in various squares), and it does stand the test of practicality.

It does, however, leave many questions unanswered. For example, what are the high-probability effectors in eqch quare? Can the 4 x 4 arrangement be better defined as a 3 x 4 or a 4 x 6, etc.? And finally, do the implied relationships between signs and effectors, or signs and signs, or effectors and effectors really exist in this way, or ought we just to go ahead and teach him phonics?

APPENDIX B

Directions for the Individualized Testing Sessions

GENERAL DIRECTIONS FOR EXAMINER

It is necessary to keep each testing session as standard as possible. Read the following overview before beginning any of the individual tests:

1. Pick the child up at his classroom.
2. Be sure to tape record the entire testing session.
3. Introduce yourself to the child, and have him introduce himself. Take a few minutes to converse in order to gain his confidence and put him at ease.
4. Be sure to record (in writing) the child's identification number on all the paperwork, as well as on the cassette tape. Precheck the tape's length and volume.
5. As an overview, tell the child you will be tape recording the session. Explain that this is necessary because the tape will be used later to validate the information gathered at this session. Explain that you will be writing things also. In general, tell him that he will be reading some real and nonsense words from lists as well as five short passages.

During the passage reading, it will be necessary to use a stop-watch. You may tell him that this will be done. Be as unobtrusive with the stop-watch as possible. Kepp it in your left hand on your lap. Administer the tests in the following order:

1. The Slosson Oral Reading Test (Bobbs-Merrill Company, 1963).

   It will be necessary to score this immediately so that you will know which level reading passage to administer first. This is

extremely important so that the child should not be presented initially with a passage that will frustrate him.

Use the following table as a guide for selection of the first reading passage.

S.O.R.T. Grade Equivalency Score	Passage Number
2.0 - 2.9	Passage #2
3.0 - 3.9	Passage #3
4.0 - 4.9	Passage #4
5.9 - 5.9	Passage #5
6.0+	Passage #6

2. The Gates-McKillop "Recognizing and Blending Common Word Parts" subtest (Teacher's College Press, 1962).

3. The Botel Reading Inventory, Phonics Mastery Test, Nonsense Words Subtest (Follett Publishing Company, 1961).

4. The graded oral reading passates.

At the close of each session, be sure to thank the child and present him with a university pencil and folder. Escort the child back to his classroom

INDIVIDUAL TEST DIRECTIONS

The Slosson Oral Reading Test (Bobbs-Merrill Company, 1963).

Read this to the child:

"Here is a list of words to read. Begin with list P and read each word. If you do not know a word, give it a try anyway. Please pause when you get to the bottom of each list. Begin."

When the child encounters a word he does not name immediately, be sure to start counting the three second time limit. When a list is reached in which he miscalls 10 or more words, discontinue the "read each word" directions, and say to him: "Look carefully down the list and read any word you know."

Allow only one trial for each word. If the child mispronounces a word, then self-corrects, still count this as an error.

When the test is completed, stop and calculate the score.

The Gates-McKillop Diagnostic Test, "Recognizing and Blending Common Word Parts" subtest (Teacher's College Press, 1962) and the Botel Reading Inventory, Phonics Mastery Test, Nonsense Words subtest (Follett Publishing Company, 1961).

Read this to the child:

"Here is a list of nonsense words for your to read. These words do not really exist and will sound strange to you. Read each one as best you can. Let's do the first one together."

(Demonstrate with the sample nonsense word provided. Have the child pronounce it with you. Allow only one trial for each word.)

Graded oral reading passages (from the basal reading series published by Harcourt, Brace and Jovanovich, 1979).

Before reading the directions to the child, be sure that the first passage to be administered matches the grade equivalency score attained on the Slosson Oral Reading Test. The remaining ones must be shuffled and administered in random order. Begin timing the child after he reads the title.

Read these directions to the child:

"Here are some stories for you to read aloud. I will tell you the title of each to give you an idea what they are about. I will not be able to help you with any words, so if you do not know one, try to figure it out by yourself."

Story #2: "The name of this story is 'Pencils'. Read the title outloud and then begin reading."

Story #3: "The name of this story is 'Would you believe it?' Read the title outloud and then begin reading."

Story #4: "The name of this story is 'Special Friendships.' Read the title outloud and then begin reading."

Story #5: "The name of this story is 'Living Lights in Our World.' Read the title outloud and then begin reading."

Story #6: "The name of this story is 'Discovering Dinosaurs.' Read the title outloud and then begin reading."

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