AN INVESTIGATION OF READING FLEXIBILITY

By

BRUFORD LEO DOYLE

Bachelor of Arts
University of New Mexico
Albuquerque, New Mexico
1961

Master of Arts
University of New Mexico
Albuquerque, New Mexico
1966

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Thesis Approved:

Darrel D. Ray
Thesis Adviser

Bernard R. Belden

Billy F. Elsom

Russell Dobson

J. Curtis Hamm

D. Durham
Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Reading flexibility is not a new concept. Reading flexibility implies the ability of a reader to adjust his reading approach in accordance with his purpose for reading, the level of difficulty of the material, and the reader's previous knowledge of what is being read.

Despite the fact that reading flexibility is an important skill, there is little being done to teach it in American schools. Squire (1965), Herber (1965) and Olson (1968) point out that content area teachers devote overwhelming attention to the study of subject matter, rather than to the skills involved in effective study within their discipline. Teachers in content areas, the above writers state, feel it more important to cover the content than to teach the reading skills in the content areas. Bennett (1965) states that teachers have become enmeshed in routine, concentrating on curriculum and forgetting the skills involved in reading to learn content and ways of approaching reading in the different fields.

Sheldon and Braam (1958) and Betts (1946) state that for a person to be an efficient reader he must possess a variety of speeds and approaches to reading. These writers reiterate Yoakam (1928) who listed four approaches to be used in effective reading. He states,

There are at least four well recognized types of reading when considered according to the rate at which words are recognized: (1) scanning or skimming; (2) rapid reading; (3) normal reading; and (4) careful reading, which includes assimilative and analytical reading.

Can reading flexibility skills be taught? Can a materials be developed that will teach a student to be a flexible reader? Can readers who score below grade level norms develop flexibility as a result of reading flexibility training? This study will attempt to add to the knowledge concerning these questions. It will attempt to do this by measuring the reading flexibility of secondary school students after they have completed a series of forty-five reading exercises written specifically to develop their versatility of approach to various types of reading material.

Need for the Study

Early studies of reading rate and its effect on reading comprehension attempted to define the unitary concept of general reading ability in terms of a correlation coefficient between reading rate and comprehension. These efforts resulted in conflicting interpretations of the effect of reading rate upon reading comprehension (Bloomers and Lindquist, 1944). In spite of the conflicting reports regarding the relationship between rate and comprehension, teachers have for the most part accepted the premise that the fast readers are the best readers (Letson, 1956). This belief on the part of teachers has caused them to emphasize speed of reading in their developmental reading programs (Letson, 1956).

Bloomers and Lindquist (1944), Carrillo and Sheldon (1952), Braam (1963), Letson (1960), McDonald (1966) and Taylor (1962) all point out

that speed of reading is not the most important factor in the determination of an efficient reader. They state that the efficient reader is the one who possesses a number of reading rates and who is able to adapt his reading rate in accordance with his purpose, the level of difficulty of the material and his familiarity with the material.

Reading flexibility research, up to the present time, has shwon that only readers reading at or above grade level are flexible in their approach to reading. Studies by Burger (1966), Levine (1966), Metsker (1966), Harris (1965), and Smith (1965) have shown the able readers to be more flexible than the less able reader. In all their studies the able and less able readers were trained and tested using the same material. The present study will attempt to demonstrate that the less able reader can be taught flexibility skills through the use of materials written at their independent reading level.

Statement of the Problem

The purpose of the study was to evaluate the effectiveness of a reading flexibility program in the development of reading flexibility skills by high performance readers and low performance readers in the tenth grade.

Purpose of the Study

The purpose of the study is to evaluate the effectiveness of a structured, directed reading flexibility program in developing reading flexibility skills of sophomore students attending Drumright High School, Drumright, Oklahoma. To analyze this problem the proposed investigation considered two questions and their related hypotheses.

A. Does a structured, directed reading improvement program materially improve the reading flexibility skills of sophomore students, i.e., will participation in the program bring about an improvement in reading flexibility skills on tests designed to measure reading rate variation when reading for the following purposes: (1) important facts, main ideas and implications; (2) complete understanding of main points, facts, ideas and implications; (3) skimming for important ideas; and (4) scanning for a specific fact? Stated in the null hypotheses, the questions are as follows:

1. There is no significant difference between the experimental group and the control group mean scores on tests measuring reading rate when reading for important facts, main ideas and implications.

2. There is no significant difference between the experimental and the control group mean scores on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications.

3. There is no significant difference between the experimental and the control group mean scores on tests measuring reading rate when skimming for important ideas.

4. There is no significant difference between the experimental and the control group mean scores on tests measuring reading rate when scanning for a specific fact.

B. What level of reader will gain most from the structured, directed reading improvement program as measured in terms of reading rate variation? Is there a difference in reading rate variability when reading for different purposes between a low performance group and a high performance group? Stated in null hypotheses the questions are as follows:

1. There is no significant difference between mean scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications.

2. There is no significant difference between mean scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when skimming for important ideas.

3. There is no significant difference between mean scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when scanning for a specific fact.

Definitions of Terms

The following definitions are given to clarify terms that are used in this study.

1. Reading flexibility will refer to the reading skill measured by the Reading Versatility Test: Intermediate Level (Form A) and is measured by reading rate variability when purpose of reading is varied.

2. Reader's purpose refers to the directed purposes of the Reading Versatility Test: Intermediate Level (Form A) and are as follows: (1) fast reading for important facts, main ideas, and implications; (2) thoughtful reading with attention to detail, main ideas, and implications; (3) skimming for important ideas; and (4) scanning for a specific fact.

3. Level of difficulty refers to the grade level at which the material is written and is determined by the Dale-Chall Readability Formula.

4. High performance group refers to that group of students who fall below the median score for the tenth grade norm on the Nelson-Denny Reading Test (Form A).

5. Low performance group refers to that group of students who fall below the median score for the tenth grade norm of the Nelson-Denny Reading Test (Form A).

6. Experimental volume refers to the forty-five reading selections adapted by the researcher from commercial and military sources. Material in the volume ranges in difficulty, as measured by the Dale-Chall Readability Formula, from sixth grade level through the ninth grade level.

Assumptions

1. The reading test (Nelson-Denny Reading Test (Form A) used in screening students for participation in the reading flexibility program is a reliable and valid measurement of the general reading ability of the study's population.

2. The reading test (Reading Versatility Test: Intermediate Level, Form A) is a reliable and valid measurement of reading flexibility of the participating students.

Limitations of the Study

An investigation in the area of social sciences includes difficulties not encountered in other sciences, i.e., attempting to identify and control factors operating on people and effecting their behavior. This becomes particularly difficult when dealing with a high school population where the environment is only slightly structured. An investigation which attempts to control these factors as they relate to reading can easily confound the results by placing too much emphasis on the measured factor while ignoring equally important but obscure factors. This investigation did not attempt to control the intervening variables or to identify or control factors affecting the reading performance of the participating students.

Population and Sample

The population consisted of randomly selected sophomore students attending Drumright High School, Drumright, Oklahoma. Subjects were chosen from those who had completed the initial screening test. Only those falling above the fifty-fifth percentile on the tenth grade norm

of the Nelson-Denny Reading Test and those falling below the forty-fifth percentile on the tenth grade norm of the Nelson-Denny Reading Test were assigned to the experimental and control groups.

The experimental group completed a structured, directed reading improvement course composed of forty-five selections. The control group received the forty-five selections, but were not given instruction in their use.

At the completion of the forty-five units of instruction the experimental and the control groups were administered the Reading Versatility Test: Intermediate Level (Form A).

Instrumentation

The Nelson-Denny Reading Test (Form A) was used as a screening instrument for the selection of subjects for the study. Only the total reading score of the test was used for the selection of participants. The Reading Versatility Test: Intermediate Level (Form A) was used to mreasure reading flexibility.

The Nelson-Denny Reading Test Manual reports a mean validity index of 47.5 for Form A. Test consistency, or reliability of the test is reported at .92 for total score.

The Reading Versatility Test Manual reports a mean validity index of .78 for the Intermediate Level of the test. Test consistency, reliability for the Intermediate Level of the test is reported at .88 for part one, .83 for part two and .55 for parts three and four.

Methodology

A Factorial Analysis of Variance statistical technique was used to analyze the differences between the experimental and control groups' results on the Reading Versatility Test: Intermediate Level (Form A). This procedure allowed for an analysis between the experimental and control groups; between the high and low ability groups and the interactive effects of the reading flexibility program.

This statistical design is described by Kerlinger (1964), Bruning and Kintz (1968), Lindquist (1956), and Dayton (1970). Testing results were computed using the Biomedical Computer Program BMD02V program in conjunction with the Oklahoma State University Computer Center's IBM 360/65 computer (Dixon, 1970).

Organization of the Study

Chapter I has given an introduction to the problem to be studied. It has included the need for the study, the statement of the problem, the purpose of the study, the definition of terms, assumptions of the study, limitations of the study, the study's population and sample, instrumentation, and methodology by which the data was analyzed.

Chapter II will present a review of the literature as it pertains to the hypotheses being tested.

Chapter III will describe the reading flexibility program, the population used, the problem being evaluated, the test used to measure reading flexibility, and the statistical methods used to test the difference between the experimental and control group means.

Chapter IV will contain a statistical analysis of the data. This chapter will indicate the degree to which the hypotheses are found to be correct within recognized limitations.

Chapter V will present a discussion of the results of this study and will include recommendations regarding future studies in this area.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The literature concerning the concept of reading flexibility is replete with theoretical constructs, but to date actual experimental research relative to the development and measurement of reading flexibility has come from studies primarily concerned with reading rate and its effects upon reading comprehension. The review of the literature for this study has been restricted to research designed to answer some of the questions raised by this study, and will be discussed under the following areas of interest: (1) studies dealing with the development of reading rate and comprehension skills, (2) studies dealing with the effect of reader's purpose on reading rate and comprehension, (3) studies dealing with the effect of material difficulty on the reader's reading rate and comprehension, and (4) studies dealing with the measurement and development of reading flexibility skills.

Reading Rate and Its Effect on Reading Comprehension

Early investigators attempted to define general reading ability on the basis of correlation coefficients between reading rate and reading comprehension test scores. The results of such research have caused a great emphasis to be placed on the development of speed in reading in

some instances (Letson, 1959) or slow word-by-word reading in others (Rankin, 1961). Bloomers and Lindquist (1944) in a review of the literature noted correlation coefficients between reading rate and comprehension ranging from -.47 to .92. Bloomers and Lindquist state that the causes for this variation were due primarily to the methods of measurement involved, or in the manner in which reading rate and comprehension have been defined.

Tests of reading rate and comprehension were generally characterized as possessing the following traits: (1) most were timed tests (Preston and Botel, 1951; Stroud and Henderson, 1943); (2) many relied on short passages (Carrillo and Sheldon, 1952); (3) most measured rate over relatively easy material (Tinker, 1939; Flanagan, 1939); and (4) some measured comprehension over material dissimilar to the rate measurement material (Carrillo and Sheldon, 1952; Carlson, 1949; Tinker, 1939).

The general type of reading rate and comprehension tests just described were criticized by Tinker (1939) because they attempted to measure a unitary concept, i.e., general reading ability on the basis of two different components of reading ability. To Tinker all that these tests measured were speed of reading in one situation and comprehension in another. Thinker attempted to measure the relationship between speed and comprehension by measuring rate of work and degree of comprehension on a series of tests ranging from easy to difficult. Tests used by Tinker in order of increasing difficulty were: (1) Chapman-Cook Speed of Reading Test, Forms A and B; (2) the Minnesota Speed of Reading Test; (3) the Iowa Silent Reading Test, Part 1; (4) Ohio State University Psychological Test, Part 5; (5) Minnesota

Reading Examination; and (6) Reading Scales in Educational Psychology. The tests, with the exception of the Chapman-Cook Speed of Reading Test, were all administered individually to university students--numbers not given. The rate of work data was computed using the standard time allowed and the total amount of time used by the student in completing the test. The three scores used in the final analysis were: (1) number of items done correctly in the standard time; (2) number of items attempted in the standard time; and (3) the total time taken to complete the test. Correlation of coefficients between equivalent forms of the Chapman-Cook test was .86. Results from the other tests evidenced lower correlations as the test materials became more difficult. Tinker concluded the article by saying, "The data warrant the conclusion that there is an intimate relationship between speed and comprehension in reading when the textual material is within the reader's educational experience."

Flanagan (1939) criticized existing reading tests suggesting that existing reading tests' purposes were ambiguous and the scores yielded by them were not true indicators of reading ability. To remove ambiguity Flanagan redefined reading rate as speed of comprehension, i.e., the number of test items completed correctly in a given time period. Using his own test, the Cooperative Literary Comprehension Test, Form 0, Flanagan tested three hundred high school seniors under varying time conditions. The difference between comprehension socres of the slow and medium times was very slight, .8 of a raw score point, but the difference between the medium and rapid time scores is much larger, 2.7 raw score points. After dividing the group into three sections on the basis of their slowest time score Flanagan compared the difference

between the medium and rapid mean scores for each of the three groups. There was very little difference between comprehension scores made by the three different groups. This lack of difference led Flanagan to make the following comments:

1. tests of reading comprehension in which time is a factor provide only ambiguous measures of level or even speed of comprehension;

2. the speed of comprehension score is dependent to a significant degree on the particular rate at which the student has chosen to work.

Preston and Botel (1951) tested the hypothesis that rate and comprehension are unrelated when measured under timed conditions. Using the Iowa Silent Reading Test, Form A, the authors tested thirty-two freshman students under timed conditions; they then administered an equivalent form of the test to the same students under untimed conditions. Speed was computed as words per minute and the comprehension score used was the total number of correct items. The correlation of rate and timed comprehension yields the statistically significant coefficient of .48. The correlation between rate and untimed comprehension yields the coefficient of .20--not statistically significant. The writers state that, in their minds, "Untimed comprehension is the 'purer' comprehension score; therefore, there is little relationship between rate and comprehension." Similar findings were reported by Stroud and Henderson (1943).

Bloomers and Lindquist (1944) in an attempt to measure the effect of rate of reading on comprehension examined what they described as the "Hypothesis of Relative Reading Rate." The authors stated that a person will not vary his reading rate between different selections. The test constructed for the purpose of this study consisted of a series of

independent reading exercises. Each exercise consisted, in order, of (a) a question to set the purpose, (b) a reading selection containing the answer to the question, and (c) four or more suggested answers to the question. Bloomers and Lindquist found that the 672 advanced high school students they tested tended to cluster around their mean rate when reading materials whose level ranged from easy to difficult. On the basis of their findings the authors concluded that a person's effective reading rate could be measured and predictions established for his reading rate when reading other types of material. Bloomers and Lindquist found a correlation coefficient of .30 between rate of reading comprehension and power of reading comprehension, and report that good comprehenders adjust their rate of reading downward as the material increases in difficulty.

Carlson (1949) measured the relationship between speed and comprehension at different levels of intelligence. He found the effectiveness of fast and slow readers as measured by accuracy of comprehension was dependent on the level of intelligence of the reader. At the upper levels of intelligence the rapid readers were more efficient and at the middle and lower levels of intelligence the slower readers were more efficient. He speculated that the low positive correlation of coefficients found in earlier studies may have been the result of the researchers' failure to include intelligence in their analysis of reading rate and comprehension.

Summary

Writers cited thus far have criticized early studies dealing with reading rate and its relation to reading comprehension for the following

reasons: (1) the difficulty of the material used in early studies varied between reading rate tests and reading comprehension tests, (2) the methods used in timing reading rate and reading comprehension tests did not differentiate between reading rate and comprehension rate, (3) the effect of reader's purpose was not taken into account when measuring reading rate or comprehension, and (4) intelligence levels of subjects were not considered in the determination of effective reading rate and its relation to reading comprehension.

Difficulty of material, reader's purpose, the method of timing, and intelligence levels have been shown to effect reading rate and reading comprehension. In the opinions of the writers cited tests that do not account for these variables will yield spurious results.

The Effect of Reader's Purpose on Reading Rate and Comprehension

Carrillo and Sheldon (1952) in a theoretical discussion of reading flexibility make the point that the flexible reader's purpose is one of the prime factors determining the rate of reading employed and the level of comprehension achieved. Bloomers and Lindquist (1944) in a study, cited earlier, noted that unless purpose as well as comprehension was controlled, the reader would not make effective adaptations in his speed of reading. They report that when purpose was defined and comprehension specified as the attainment of the pre-set purpose for reading, good comprehenders tended to vary their reading speed according to the nature and difficulty of the test; poor comprehenders did not make similar adjustments.

To study the effect of purpose upon reading comprehension Distad (1927) divided 250 sixth grade students into eight experimental and two

control groups to compare the reading performance of pupils under different conditions. Specifically, he compared the comprehension of the subjects after a single reading when: (1) the reading was undirected; (2) when pupils read to find the answers to a list of eight questions given by the experimenter; (3) when pupils are given a general problem; and (4) when the purpose for reading was to find the answers to eight questions raised by the pupils as a group. Materials used in the experiment were taken from textbooks and magazines, and contained geographical, nature, narrative and poetry type readings.

Distad found that the immediate recall of groups given specific questions, raised questions, and problem solving methods of treatment exceeded the immediate recall of the group given no direction for reading on ten of the twelve comparisons made. Distad concludes the article by saying:

> Reading with a problem or with questions may be used when definite information is desired. When thus used, directed types of reading are intrinsically worth while in that they develop habits of reading effectively for different purposes.

Shores and Husbands (1950) investigated the problem of whether fast readers are the best readers when reading is employed as a tool for problem-solving in the area of science. Using their own test Shores and Husbands tested a total of ninety students in the fourth, fifth, and sixth grades of a midwestern school. The test consisted of three parts. They were: (1) a problem to set the purpose for the reading; (2) the reading passage containing all the facts and data necessary for solution of the problem; and (3) twenty multiple-choice items with four possible choices for each question, one of which was definitely better than any of the others. The three scores derived from the test were: (1) original reading time; (2) working time (rereading and answering

questions); (3) total time. Coefficients of correlation were used to express the relationship between rate of reading and comprehension. In their study, the statement "fast readers are the best readers" could only be justified by a high correlation between original reading time and comprehension. Shores and Husbands obtained a coefficient of correlation between original reading time and comprehension of -.13. They, therefore, concluded that fast readers are not the best readers. In summary they say, "The relationship between speed of reading and comprehension depends to a large extent upon the purpose set for the reading and the nature of the reading material."

Shores (1961) in a study similar to Shores and Husbands' study tried to determine if fast readers are the best readers when reading to solve a problem in the area of science. In addition to a similar sixth grade population used in the first study Shores also examined a group of able adult readers using the criteria of the 1950 study. The results supported the findings of the 1950 study, that low or negative correlations of coefficients between speed of reading and comprehension were obtained. One added dimension of this study was an analysis of reading flexibility skills of the two groups. The adult population tended to slow their rate of reading down when reading science materials but the sixth grade group read at what amounted to an almost invariant rate. In his conclusions Shores states, "Efficient adult readers are much more flexible in adjusting reading rate to the demands of the task than are sixth-grade students."

Troxel (1959) examined the effect of pre-set purposes on reading rate and comprehension of matched pairs of eighth grade students when reading expository mathematical materials to either answer a specific

question or determine the main idea of the material. Troxel used twenty selections to measure both rate and comprehension of twenty-two subjects when reading to answer a specific question and another twenty-three subjects when reading to determine the main idea. An analysis of the results showed that the reading rate scores of the group reading to answer a specific question were significantly greater at .01 level of confidence. Reading comprehension of the group reading to answer a specific question was significantly better at the .05 level of confidence. Troxel concludes: "The purpose for reading influences the speed with which the material is read." After comparing the results of his tests with the scores the subjects obtained on the Iowa Silent Reading Test he states: "Those who read the expository mathematical material faster and with better comprehension also tend to achieve higher scores on the general reading ability tests."

Troxel's findings support those of Maney (1958) in science, Sochor (1958) in social studies and were replicated by Koester (1961).

Artley (1944) investigated the relationship between scores on tests purporting to measure abilities related to comprehension in a specific subject-matter area and scores on a test designed to measure a more general type of reading comprehension. Additionally, he sought to determine the extent to which reading comprehension of both the general and specific types enters into an informational type of achievement in a specific subject-matter area. He also looked into the importance of certain factors assumed to be components of reading comprehension in specific subject matter areas and the effect of vocabulary on a subject's comprehension in a specific subject-matter area.

Artley administered the following tests to eleventh grade students

to determine the relationships listed above: (1) Test of Reading Comprehension, C1; (2) Social Studies Abilities Test; and (3) The Application of Principles Test, 1.5. Test results yielded a coefficient of correlation of .78 between tests measuring comprehension in a specific content area and general reading ability. The intercorrelations between the measures of the several factors presumed to be components of reading comprehension in the subject-matter areas studied indicated positive through moderately low relationships. Among the eight factors examined Artley reported a range of .275 to .785 with several over .60. These results caused Artley to state that the results show a necessity for the "delineation of the reading purposes or abilities essential for adequate comprehension in each area of experience."

Henderson (1965) studied pupil-purpose setting behavior in reading. Specifically he examined the following hypotheses: (1) achievement in reading is independent of achievement in the setting of individual pupil purposes for reading; (2) achievement in purpose setting is independent of achievement in purpose attainment; and (3) achievement in purpose setting is independent of comprehension on material posing minimal word recognition difficulties, (a) when pupil purposes are elicited, (b) when teacher purposes are supplied, and (c) when purposes are neither elicited or supplied.

From a fifth grade population of 462, Henderson selected twenty-four good and twenty-four poor readers on the basis of their total School and College Ability Test Intelligence score and Sequential Test of Educational Progress reading scores. Each of the subjects read four stories, the first being the same for all and the last three chosen at random. Subjects were directed to read the title of the first story,

study the picture and then tell what they thought the story might be about and what they would read to find out. In the second reading experiment purposes were supplied; in the third reading purposes were neither elicited nor supplied.

Purpose-setting achievement was measured by a summed score of five subordinate rating scales. The scales rated number of conjectures; number of purposes; creativity; use of evidence; and oral expression of the subject. An analysis of variance of the data showed that there was no significant difference between good and poor readers at the .01 level of confidence in the establishment of purposes for reading in any of the three conditions of the experiment. Henderson adds that the differences obtained, while not significant, suggest a positive relationship between reading ability and the ability to set purposes for reading, and that the main difference between good and poor readers as defined by the criteria of the study was in the area of critical thinking.

Research cited to this point has shown reader's purpose to have an effect on reading comprehension. Studies in which purpose was not controlled yielded indefinite results. Pre-set purposes have also been found to have a negative effect on reading rate and comprehension.

Bloomer and Heitzman (1965) studied the effect of pre-reading questions on paragraph reading rate and comprehension. Using selections from the McCall Crabbs Test Lessons they tested reading rate and comprehension of 146 eighth grade students under the following conditions: (1) pre-test followed by a reading selection, followed in turn by a post-test identical to the pre-test; (2) a reading selection followed by a post-test; (3) a reading selection adapted for cloze

procedure followed by a post-test; and (4) a reading selection preceded by a pre-test followed by a post-test. The subjects were randomly assigned to treatments and to reading selections within classes. The group receiving the cloze materials without a pre-test mean comprehension score on the post-test was significantly better at the .01 level when compared to the groups given pre-testing before reading.

Bloomer and Heitzman, on the basis of the experiment's results, state:

> The effect of a pre-test upon an individual is that the pre-test basically reduced the tension on the individual, reducing motivation to learn. This, therefore, suggests that pre-testing is not a good procedure for use in short reading comprehension materials, and that paragraph reading comprehension materials should be presented without pre-test, but followed by post-test material.

Frase (1970, 1969) using adult populations, reports similar findings as those reported by Bloomer and Heitzman.

Summary

The review of the literature related to the effect of purpose has shown that a reader's purpose will effect his reading rate and level of comprehension. Additionally, programs which provide instruction in purpose setting for reading improve reader adaptations to varying reading situations. General reading ability test results do not necessarily indicate a reader's ability to vary his approach to reading and reading tests that do not control reader's purpose yield spurious results. Some research studies have questioned the effectiveness of pre-set purposes on reading rate and comprehension.

The Effect of Material Difficulty of Reading Rate and Comprehension

Tinker (1939) found that rate of reading and comprehension were affected by the level of the material being read. In his study the correlation between rate of reading and comprehension on easy material was .93, but as the material increased in difficulty the correlation decreased until there was only a correlation of .48 between the two variables on the most difficult material.

Robinson and McCollom (1934) used the Van Wagenen Scales for English Literature to study the effect of material difficulty on the rate of reading and comprehension of good and poor readers. Test scores from the Iowa Silent Reading Test were used to identify the highest and lowest fifteen per cent of a freshman class entering a midwestern college. The Van Wagenen Scales was used because it was an untimed test and closely paralleled content area materials, but more importantly each scale became progressively more difficult in its content and demands it placed on the student. Robinson and McCollom's data showed that good readers were superior to poor readers in rate of reading and comprehension when the difficulty level of the material increased.

The effect of material difficulty on rate and comprehension was studied out by Stroud and Henderson (1943) when they investigated the relationship between the rate of reading and learning. Learning was defined by Stroud and Henderson as the ". . . understandings, concepts and meanings gained from reading the text, when a test was administered without a time limitation immediately after the completion of reading." Using the Iowa Every Pupil Test of Basic Skills they measured the reading rate and comprehension of 288 students, every student in grades five

through eight of a small mid-western town. The subjects were given as much time as they needed to read the selections and answer the questions. The correlation coefficients between rate of reading and learning by grade were: grade five, .06; grade six, .02; grade seven, .12; and grade eight, .02.

The findings caused Stroud and Henderson to make the following conclusions:

1. The obtained coefficients between learning scores and reading time under the conditions of this experiment, suggests a zero relationship between the two variables.

2. While there is no evidence in the results of this experiment, that fast readers are any more adaptable than slow readers, there is some evidence that good readers are more successful in adapting rate to difficulty than are poor readers.

Carlson (1949) studied the relationship of reading to accuracy of comprehension at different levels of intelligence when the difficulty level of the reading materials was varied. In order to measure this relationship Carlson constructed a test to measure speed of reading at different levels of difficulty. In addition to his test Carlson administered the Gates Silent Reading Tests, 3-8; to measure the effects of different purposes on rate of reading and the California Test of Mental Maturity, Elementary Series to 330 fifth-grade pupils in eight different schools. After scoring the California Test of Mental Maturity Carlson divided the population into three groups, high, medium and low intelligence groups. He then established what he called fast reading groups and slow reading groups within each intelligence group on the basis of rate scores taken from his speed of reading test. Carlson's

data showed that at the upper level of intelligence the difficulty of material had little effect on his subjects' speed of reading and accuracy of comprehension. At the middle and lower levels of intelligence as the material read became more difficult the relationships observed were more markedly negative, i.e., significant at the .05 level of confidence. This led Carlson to conclude that any reading program emphasizing speed *per se* is apt to be disastrous to the accuracy of comprehension of the less able reader.

Shores (1961) found that forty-six sixth grade students when compared with able adult readers tended to read the more difficult passages of his *Reading for Problem Solving in Science Test* at lower rate than normal, but they did not slow down at the same ratio as the adult readers. Where the adults reduced their reading rate by seventy-eight words per minute, the sixth grade only slowed their rate by fourteen words per minute. In terms of comprehension the children scored seventy per cent as well as the adults on the easy material but only fifty-two per cent as well on the difficult selection.

While difficulty of material did not effect the rate at which the sixth grade subjects read, it did effect a loss in comprehension. On the basis of his findings Shores recommended that more instruction be given by content area teachers in the area of reading rate adjustment when materials are unfamiliar or more difficult than those in which the student is experienced.

Letson (1959) through the use of a self-constructed reading flexibility test to measure the effect of material difficulty and reader's purpose on reading rate variation and comprehension. In order to measure the effects of difficulty the first portion of his test had the

reader read two selections, one classified as easy by the author and one classified as difficult, but of both having the same purpose. The mean rate of 601 junior college freshmen on the easy selection was 270 words per minute; on the difficult selection their mean rate was 238 words per minute. When difficulty level was held constant and the readers asked to read for different purposes, there was a variance of twenty-two words per minute in reading rate between selections. The following table (Table I) shows the relationship found by Letson between reading rate and comprehension under the four conditions of his test.

TABLE I

CORRELATIONS BETWEEN READING RATES AND COMPREHENSION SCORES OF THE FOUR SUBTESTS WITH COMPREHENSION AS THE NUMBER OF RIGHT RESPONSES

Difficulty Level		Purpose	
Easy	Difficult	For Main Idea	Mastery
(1)	(2)	(3)	(4)
.765	.461	.799	.747

These correlations received the following interpretation from Letson:

> Three of the correlation coefficients show a marked relationship from .747 to .799. The coefficient .461 for the difficult material is comparatively small. From this it would appear the difficulty of the material exerts a greater influence on rate of reading than do other factors.

Correlation coefficients between rate and comprehension when the number of correct responses are divided by the number of attempts ranged from -.096 to -.134. On the basis of this finding, Letson suggests that the fastest readers are not necessarily the best comprehenders. Similar findings were made by Robinson and Hall (1941).

Kershner (1964) using 420 adults studied the effects of stress and level of difficulty of material on reading rate. His population--ranging in age from eighteen to eighty-five and education from grade four through five years of graduate study--were asked to read four selections ranging, by his criteria, from easy to hard in level of difficulty. The first two selections were read by the subjects who were unaware that they were being timed or that they would be asked a comprehension question at the end of the reading. The last two articles were read with the subjects knowing that they were being timed and knowing they would be asked a question at the end of the reading.

Using a *t* test, the mean reading times between the two pairs were compared and the second set of reading rates was significantly faster at the .01 level of confidence. The data, for this study, caused Kershner to conclude that a person will increase his reading speed when he knows he is being timed. This finding was also borne out in the analysis of reading rate with level of difficulty varied. The subjects increased their reading speed for difficult selections on the second set over their reading speed for easy selections on the first set of reading selections at the .01 level of confidence.

Summary

Research cited on the relationship between material difficulty and reading rate and comprehension has reported that correlation coefficients between reading rate and comprehension decrease as the material becomes more difficult. This finding has caused researchers to caution against reading programs that emphasize speed, because, in these writers' minds, such programs may have an adverse effect on readers who are average or below average in intelligence. Good readers in the studies cited displayed an ability to vary their reading rates as material became more difficult. Poor readers showed no such capability.

Programs which emphasize reading rate adjustment in accordance with reader's purpose and material difficulty were recommended. Material difficulty was found to be a more important factor in a reader's reading rate variation than was the reader's purpose.

The Measurement and Development of Reading Flexibility

Earlier in this chapter research studies pertinent to the measurement of reading rate and comprehension were cited. Results of these studies yielded conflicting viewpoints on the relationship between reading rate and reading comprehension. As pointed out by Tinker (1939) the content and structure of the tests used by researchers in their attempts to measure the relationship between speed and comprehension hampered their research.

McDonald (1966) states,

> As research continued, numerous interpretations of the terms 'reading rate' and 'comprehension' were proposed. Conflicting methods of computing reading test scores utilizing various mixes of rate and comprehension scores were devised. Many researchers despaired of validly assessing rate and comprehension generally. Thus, there seems to be disagreement on
>
> 1. the relationship of speed and comprehension,
> 2. the terminology associated with speed and comprehension,
> 3. the methods of measuring speed and comprehension.

McDonald summarizes by saying that much of the disagreement over rate and comprehension studies is a consequence of considering "rate" and "comprehension" as independent and co-equal entities. "Both," he says "are interdependent constructs."

Bloomers and Lindquist (1944) state that "the relationship between reading rate and comprehension has been extensively studied with widely varying results--correlation coefficients ranging from -.47 to .92." These variations they say, ". . . are due primarily to differences in the measurement employed, or in the manner in which reading rate and comprehension have been defined." They point out the same inconsistencies noted by Tinker in an earlier article; i.e., researchers tended to employ measuring instruments without regard to their appropriateness in a study of the relationship between rate and comprehension.

Bloomers (1944), Carrillo and Sheldon (1952), Shores (1950, 1960), Carlson (1949), Braam (1963), Letson (1960), McDonald (1966), and Taylor (1962) all point out that speed of reading is not the most important factor in the determination of an efficient reader. They state that the efficient reader is the one who possesses a number of reading rates and who is able to adapt his reading rate in accordance with his purpose, the level of difficulty of the material, and his familiarity

with the material. The person who is able to do this is a flexible reader. Sr. Mary Theophemia (1962) states that a rapid speed of reading is not as important as flexibility or versatility in the use of a number of reading methods.

Reading flexibility can be taught. Shores (1960) states that reading teachers in the intermediate grades should teach much more than they do about the nature of the reading process so that they (the students) will know when they are reading for a given purpose. He states, "They (the students) should know the possibilities of varying reading procedures with the requirements of the task."

Braam (1963) conducted a flexibility experiment in which he tried to determine if flexibility rates could be measured and if flexibility skills could be taught. In both his tests and reading instruction materials, he attempted to control the reader's purpose and difficulty of materials, but did not try to control the student's familiarity with material. Both the pre- and post-tests consisted of five sections ranging in length from 750 to 900 words and representing five different kinds of material (fiction, literature, science, history, and psychology). Content difficulty of the materials was controlled by taking pre- and post-test items from a common source and subjecting the material to the Dale-Chall Readability Formula. The stated purpose for each of the five sections was for the student to read as fast as he could and still understand the general content of the selection. Gross rate--reading rate in words-per-minute regardless of percentage of comprehension--on the pre-test ranged from a high of 230 words-per-minute in science to a low of 211 words-per-minute in history. Effective rate--reading rate in which comprehension has been considered by multiplying

gross rate by percentage of comprehension--ranged from a high of 172 words-per-minute in science to a low of 163 words-per-minute in fiction. After flexibility training the group's average gross rate ranged from a high of 808 words-per-minute in psychology to a low of 649 words-per-minute in psychology to a low of 450 words-per-minute in science.

Sheldon and Braam (1959) report that they were able to improve adult reading flexibility in a ten week reading improvement program and that gains in rate and flexibility of the individual taught did not diminish with time. They state that "these same men, when tested a year later, showed an average flexibility rate of 363 words compared to 94 words at the beginning of instruction."

The fact that reading flexibility is an important and teachable skill is evidenced by the emphasis placed upon flexibility training by college and adult reading improvement centers. Geerlofs and Kling (1963) report that an analysis of questionnaires sent to 246 colleges, universities, and reading clinics showed that next to the development of reading comprehension, these facilities felt reading flexibility was the next most important skill they should teach to participants in their programs. It ranked above rate of reading, study skills, vocabulary and other related reading skills.

Theophemia (1962), using the Reading Versatility Test: Basic Level, tested 450 eighth grade students in several Milwaukee and Chicago schools. The test consisted of five sub-tests, each measuring reading rate when reading for different purposes, i.e., study reading, rapid reading for main ideas; skimming and scanning exercises. Rates derived from four of the sub-tests were compared with the subject's rapid rate for main ideas, and ratios established between it and the rates for

study, skimming, and scanning. Theophemia found that the readers tested read all selections at what amounted to an invariant rate.

Herculane (1960) found that 102 eighth grade students taking a reading flexibility test read at an invariant rate when asked to read rapidly, skim, and read for a thorough understanding. The mean rate for rapid reading was 213 words per minute; for skimming, 215 words per minute; and thorough reading, 201 words per minute. Herculane also found that students used in her study could not verbalize the concept of flexibility in reading rate. In her conclusions Herculane makes the following points:

1. The pupils of the eighth grades tested had a very insignificant variation in speed and technique according to the purpose for reading.

2. No pupil was capable of defining or explaining the concept of flexibility or reading rate accurately.

3. Approximately ninety per cent of the students were aware of the need to determine purpose and speed, but, in actual performance in reading, they did not make this knowledge sufficiently funcitonal.

Shores (1960) in a study cited earlier reported that sixth graders used in his study were unable to adapt their reading rate in accordance with their purpose, difficulty of material and type of content. McDonald (1963) reports that ninety percent of 6000 elementary, secondary, college and adult readers tested by him tended to maintain a characteristic approach to nearly all types of reading, despite instructions for differentiation of purpose and in spite of variations in difficulty of style, text and content.

Moe (1963) found that 360 college students, tested by him, read third grade and twelfth grade materials at the same reading rate. Subjects in Moe's study were required to read both levels of material

orally and silently. Reading rate and comprehension were checked for each type of reading. After completing a reading improvement program the subjects' pre-training and post-training rate and comprehension scores were compared. The results showed that the subjects increased their reading rate slightly as a result of training, but still read the third and twelfth grade materials at the approximate same rate. On the basis of his findings Moe makes the following observations: (1) college students in his study tend to read at approximately the same rate whether they are reading third grade or college-type material, (2) after training their flexibility increased only slightly, and (3) if the sample is a good one and the test a valid one, colleges are graduating a great number of slow, inflexible readers.

Letson (1956) made the first serious attempt to construct and validate a reading flexibility test. He states, "Since no satisfactory tests of flexibility were available it was necessary to build an instrument capable of measuring this skill." Letson's Reading Purpose Test consisted of two parts. In the first part the difficulty level of the material was varied, but the purpose for reading held constant. In the second part of the test the purpose was varied but the difficulty level held constant. The sample population was composed of 601 college and junior college freshmen. Letson also administered the Cooperative Reading Test; the Ohio State University Psychological Examination; and the Otis Self-Administering Tests of Mental Ability for correlational purposes. The correlation between the Reading Purpose Test and the Cooperative Reading Test was positive but low. Correlations between the Reading Purpose Test and the Ohio State University Psychological Examination showed a negligible relationship between flexibility scores and

abilities measured by the latter instrument. The same was true of the correlation between the Reading Purpose Test and the Otis Self-Administering Tests of Mental Ability. These low correlations between the Reading Purpose Test and outside criteria, in Letson's words,

> Suggest that the ability to vary the rate of reading has little relationship to reading achievement or to mental ability as measured by the outside criteria. Flexibility of reading rate is apparently a characteristic that is acquired rather than innate.

Harris, et al, (1965) examined the following questions relative to the variability of reading rate of students in grades four, five and six. (1) Do children in grades four, five and six have a relatively invariant, generalized speed set in reading regardless of their purpose in reading? (2) Is speed of comprehension for defined purposes affected by grade level, passage style and sex differences? (3) Are the answers to the above questions the same for within-individual indices of time-purpose variability as for raw time scores of reading rate scores in words-per-minute?

Their population consisted of 100 subjects in each of the different grade levels. The fourth grade subjects had participated in a two week training experiment emphasizing reading for defined purposes; the fifth and sixth grade subjects had not received such training. An analysis of variance was used to study the degree of variability in reading time of pupils by grade levels with respect to three reading purposes, styles of writing, and sex. Three separate analyses were run for the three types of scores examined, i.e., reading variability, total reading time, and rates in words per minute. Reading variability mean scores were not significantly different between the sexes or between the grade levels. Total reading time differences between grades

were significant at the .01 level of confidence as were words per minute differences. The results show that, for students in this experiment, individual variability indices of the relative adjustment or difference in reading time for three different purposes is not significantly different from one intermediate grade level to another, whereas, reading time in seconds or reading rate in words per minute does change significantly during this period. In Harris' words: "Children on the average become more efficient in the latter grade levels but not more variable in their adjustment of reading speed to reading purpose."

Early training in the development of reading flexibility skills was recommended by Harris. On the basis of his findings Harris would incorporate short term training periods in reading flexibility skills to able readers in the fourth grade. In Harris' opinion programs that instructed children to read for specific facts, main ideas and sequencing of information and vary their reading speed for each purpose would be appropriate in the fourth grade. These recommendations are at variance with Metsker (1965) who would provide such training in the secondary grades.

Metsker (1966) in a study designed to determine the relationships between reading versatility and other reading and mental abilities examined eighty-seven sixth grade students whom she determined to be able readers, i.e., reading at or above grade level. Instruments used by Metsker were: the Iowa Tests of Basic Skills; the Gates Basic Reading Tests; the Reading Versatility Test--Basic Level; and the Kuhlmann-Anderson Test. She hypothesized that there was a positive relationship between reading rate, reading flexibility, and mental age and that there was a positive relationship between the ability to skim and scan read-

ing material and mental age. Metsker found a low positive relationship between mental age and reading rate; and no relationship between mental age and reading versatility. Additionally, she found no relationship between mental age and the ability to skim or scan when reading. On the basis of her findings Metsker recommended that schools and teachers consider placing in the curriculum provisions for the development of reading flexibility skills at the upper grade levels.

Levin (1966) used a group of 100 subjects in the ninth grade to study the relationship between reading ability and reading flexibility. Her investigation attempted to answer two main questions, i.e., is flexibility of reading rate a spearate reading skill to be taught alone with other reading skills or is it a concomitant of good reading? Secondly she sought an answer to the question of what is the effect of material difficulty and reader's purpose upon reading flexibility?

The following tests were administered in two sessions which were separated by "several" days and after completion of the testing the data were analyzed. The tests were: The Cooperative English Test: Reading Comprehension, Form 2A; the Otis Quick Scoring Mental Ability Test: Gamma Test; and an experimenter developed reading flexibility test. The reading flexibility test consisted of two parts, i.e., flexibility according to difficulty and flexibility according to purpose.

Correlation of flexibility and rate of comprehension scores on the Cooperative English were insignificant, as were correlations between the flexibility test and the Otis Quick Scoring Mental Ability Test. The researcher did report significant differences at the .01 level of confidence in reading rate between easy and difficult material, and between rates when the purpose was varied. She concluded that flexibility

does not necessarily accompany good reading and that flexibility training should be provided in the classroom. Purpose, according to the writer, is a bigger factor in inducing flexibility among good readers than is level of difficulty. The reverse of this was true for the less able readers in the study.

Smith (1966) investigated the problem of whether high school freshmen who did not adjust their reading to different purposes could learn to read for a variety of purposes through planned, systematic instruction and, as a result of this instruction, if these students would read significantly better than students taught by general procedures in English classes. For her study she divided 124 freshmen students into fourteen experimental and fifteen control classes to test the following hypotheses: (1) experimental subjects will read significantly better when reading for details, main ideas, comparison and contrast, sequence, cause and effect, and generalizations than will control classes; (2) experimental subjects will independently identify purposes for reading significantly better than will control subjects; (3) experimental subjects will comprehend what they read significantly better than will control subjects; and (4) experimental subjects will adjust their reading techniques to different purposes for which they have been taught to read significantly better than will control subjects.

Smith pre-tested all experimental and control classes with her own Purpose of Reading Test; the Cooperative English Test: Reading Comprehension, Form 2A; and the Otis Quick Scoring Mental Ability Tests: New Edition, Gamma Form EM. The results from the Purpose of Reading Test were used to identify those students who could not read for and identify purposes of reading. The latter two tests were used to match the

control and experimental groups. The Purpose of Reading Test and the Cooperative English Test: Reading Comprehension, Form 2B, were administered at the completion of eight months of instruction in the experimental program. The material utilized in the study was typical freshman reading assignments used in the school but with the experimental groups also receiving instruction in how to set and judge purposes for reading and reading approaches.

The experimental population in Smith's study did not read significantly better than did the control population when reading for details, main ideas, comparison and contrast, sequence, cause and effect and generalizations. The experimental population did identify purposes for reading significantly better at the .01 level of confidence than did the control population.

The Cooperative English Test was used to measure the experimental and control groups' level of comprehension. There were no significant differences between experimental and control groups in the adjustment of reading rate to the different purposes for reading. Because the experimental group was more successful in identifying purposes for reading, Smith recommends that

> Instruction in purposeful reading should be extended to other grade levels, both above and below ninth grade, and to other content areas so that students can become proficient in reading materials for different purposes.

Thompson and Whitehill (1970) hypothesized that there was a positive relationship between reading flexibility and gains obtained in a college developmental reading program. To test the hypothesis they pretested sixty-four students enrolled in a college reading improvement course using the Reading Versatility Test. They then selected thirty-nine subjects whom they divided into three groups on the basis of

flexibility ratios obtained from the above test, i.e., high flexibility, medium flexibility and low flexibility. After sixteen, forty minute periods of instruction, in which Brown's Efficient Reading workbook was the training device used, the subjects' initial word per minute rate on a selection from that book was subtracted from the final word per minute rate on a selection from it to determine the word per minute gain of the subjects.

Analysis of data showed no significant differences in gain made by the low and medium groups, but the difference in gain between the high and medium flexibility groups was significant at the .05 level of confidence. In summary Thompson and Whitehill argue for the incorporation of flexibility training in developmental reading programs.

Braam and Berger (1968) in an attempt to measure the effects of four different approaches designed to increase reading rate, comprehension, flexibility, and retention of gains derived from instruction established four reading groups plus one control group for experimental purposes. Group one received tachistoscopic training; group two utilized the controlled reader; group three used pacing machines; and group four received instruction in the paperback scanning technique.

The experimental group consisted of 179 university students enrolled in a freshman reading-study skills course. The control group consisted of 76 students enrolled in freshman English courses.

A test battery consisting of the Van Wagenen Rate of Comprehension Test; the Robinson-Hall Reading Test of History; and the Braam-Sheldon Flexibility of Reading Test was administered before the start of the semester and alternate forms of the same tests were administered

seventeen weeks later at the end of the semester and again eight weeks after the first post-test.

Results of the first post-test showed that all experimental groups made significant increases in rate of reading over the control group, but that they did not make significant gains in comprehension over the control group. The paperback scanning group was significantly better at the .01 level of confidence in increasing reading rate over the other three experimental groups. None of the experimental groups improved in reading flexibility. Testing done eight weeks later revealed no significant loss in reading ability as measured by tests given eight weeks after training was completed.

Hill (1964) investigated the influence of three prereading directions upon the rate and comprehension performance of a sample of able, advanced college readers. He also studied the influence of rereading of test selections upon comprehension. The subjects used in the study were fifty-four majors in English Education. Hill first administered the Nelson-Denny Reading Test to the group to determine the general reading ability of the test group. Hill then administered an experimental test consisting of three, twelve hundred word selections. Each selection was to be read for a different purpose. The purposes were: (1) study, (2) to identify the main ideas, and (3) to critically analyze the motives and attitudes of the author. Reading rate was determined over each selection by the amount-time limit procedure. The comprehension check was untimed. Since it was administratively impossible to assign all subjects to all treatment combinations, each subject was randomly assigned to effect a counterbalanced order of reading selection, of reading direction, and of selection-direction combination.

Subjects chosen to investigate the second question were randomly selected from the total group. They numbered thirty-seven. The results showed that the differences in mean performance on rate, total comprehension and the three specific areas of comprehension when the subjects read to satisfy the three prereading directions were very slight. Although differences in rate between selections were noted by the researcher they were not considered as signs of flexibility because as Hill states, "The rather minimal performance in accuracy of comprehension suggests that this decreased rate may reflect reading 'frustration' rather than conscious and effective flexibility." The thirty-seven students who took part in the rereading exercise showed a significant improvement in comprehension at the .001 level of confidence.

Hill concludes his study by saying, "The lack of flexibility in both reading rate and comprehension revealed by these advance readers may imply that the prereading directions could not produce effective reading adjustment rather than reflecting true rigidity in reading performance.

Laycock (1955) examined whether or not readers with similar reading skills could change their reading rate if they were asked to do so in order to read as rapidly as they could. Subjects used in the study were 391 applicants for admission to a cosmopolitan university and 101 upper division and graduate students. From this initial population thirty-seven students were identified as being flexible or able to change reading rates when asked to do so, and 35 identified as being inflexible or unable to do so. This determination was made on the basis of a reading exercise constructed by Laycock.

Laycock next administered an eye-movement camera exercise to determine eye movement patterns of the "flexible" and "inflexible" groups in normal and rapid reading situations. Examination of the eye-camera data showed that the flexible group was more efficient, requiring few fixations per passage, shorter fixations and making fewer regressions than the "inflexible" group.

In discussing his findings Laycock states "In this study . . . the more flexible group was significantly superior in most eye-movement measures." In regards to rate of reading he points out that

> Rate is not the all-in-all for fast reading still demands comprehension. The more flexible reader is merely one who can jump from one reading to another and read in each at a faster or slower rate than usual. The less flexible reader, on the other hand, does all his reading--regardless of speed or ease of comprehension--at more nearly the same rate.

Rankin and Hess (1971) studied variations in reading rate of college students when the level of difficulty of reading material was varied within a given reading selection. The rational of this study was based on the findings of Letson (1959) who found that difficulty of material was more important in causing a subject to vary his reading rate than was the effect of the reader's purpose in reading rate variation. Rankin and Hess state:

> The conception of reading flexibility upon which the present study is based is that internal (intra-article) adjustment in rate is a function of variations in the difficulty of the reading material in successive portions of a total article.

On the basis of initial rate of reading scores, Rankin and Hess selected 127 subjects from a total population of 255 freshmen enrolled in college reading improvement classes. They identified the experimental subjects as either being in the top or bottom portions of the

sample, but did not specify the number in each sub-population. Equivalent forms of the Diagnostic Reading Test: Survey Section were adapted by the researchers and were administered before and after one semester of reading improvement instruction.

In adapting the Reading Diagnostic Test, Rankin and Hess converted the rate measurement from a words-per-minute scale to an interval scale in which they measured the number of words read by the subject in fifteen second intervals. Additionally they established difficulty levels through a Cloze procedure in which they deleted every fifth word. A correlation of coefficient statistical device was used to measure the effects of rate and level of difficulty upon a subject's flexibility. Rankin and Hess reasoned that a high negative correlation of coefficient would indicate maximum flexibility. Rankin and Hess reasoned that a high negative correlation indicates a tendency to slow down for more difficult passages and to speed up for easier passages. In contrast, a positive correlation reflects a tendency to speed up for more difficult passages and to slow down for easier passages. Results of the pre-test yielded a coefficient of -.34 which was not significant. The post-test coefficient, -.48, was significant at the .05 level.

In spite of the significant results obtained, Rankin and Hess were not willing to postulate that subjects in their study had developed reading flexibility skills. They state:

> All post-training sub-group coefficients were . . . the same as the total group post-training coefficients. Either internal reading flexibility is a remarkably stable phenomenon as far as group differences are concerned, or the technique of arriving at sub-group coefficients by correlating sums of rate measurements for each one-hundred word segment (for a particular group) with the corresponding difficulty measurements serves to obscure sub-group differences.

Rankin (1972) reports that a statistical analysis of individual coefficients for each subject in the above cited study showed that the experimental subjects had improved their mean flexibility coefficient from a -.16 on the pre-test to a -.27 on the post-test and that the difference was significant at the .05 level. On the basis of his findings Rankin cirticized earlier flexibility studies because they tended to under-estimate the actual degree of flexibility present in the reader because of the method in which they had operationally defined and measured flexibility.

Summary

Reading flexibility has been characterized, by the authors cited, as the ability of the reader to vary his reading speed in accordance with his purpose for reading, the difficulty of the material and his experiential background. In spite of the fact that reading flexibility is a teachable skill little is being done to incorporate reading flexibility training into the curriculum of American elementary and secondary schools; as a result graduates of most American high schools are not flexible in their approach to differing reading situations.

Research results have caused disagreements as to the appropriate grade level in which to begin reading flexibility training. There is also disagreement as to whether reader's purpose or material difficulty is more important in causing a reader to vary his reading rate. These disagreements may be the result of a failure by researchers to develop suitable instruments for the measurement of reading flexibility.

Summary

This chapter has been a review of the literature concerning the development and measurement of reading flexibility. Reading flexibility has been examined from the standpoints of (1) the effect of reading rate on reading comprehension, (2) the effect of reader's purpose on reading rate and comprehension, (3) the effect of material difficulty on reading rate and comprehension, and (4) the development and measurement of reading flexibility.

Early reading rate and comprehension studies were criticized for their failure to control the difficulty of the material used in their studies, failure to control reader's purposes for reading, the use of questionable timing procedures, and the inattention paid to the levels of intelligence of subjects used in the studies. Later studies have shown that difficulty of material, reader's purpose, timing and level of intelligence do effect reading rate and comprehension.

Reading programs emphasizing purpose setting behavior in reading have produced reading rate variation by good readers. Poor readers in such programs did not learn to vary their reading rate when reading for different purposes. General reading ability reading tests were found to be poor instruments when measuring reading rate for different purposes. Most authors cited in the review constructed their own tests to measure reading rate and comprehension when reading for varying purposes.

Reader's purpose was found to be less important than material difficulty in producing reading rate variation. The review shows that as material increased in difficulty the correlation between reading rate and comprehension decreased. Good readers were shown to be more

adaptable in varying their reading rate when material increased in difficulty. Poor readers read more difficult material at approximately the same rate as they read easier material with a resultant loss in comprehension.

Reports from rate/comprehension studies have caused teachers to accept a speed score as a true appraisal of the reader's ability. Such acceptance can only be justified for material similar to that found in the reading test. The review shows that unless a general reading ability test accounts for reader's purpose and material difficulty it will yield a questionable appraisal of a reader's ability.

Reading flexibility researchers have attempted to study the effect of reader's purpose and difficulty of material on flexibility. With the exception of one study none of the researchers have been able to state conclusively that subjects in their studies have developed or evidenced true reading flexibility on tests designed to measure flexibility of reading rate. The instruments used in the cited studies are of dubious value. None of the tests controlled for reader's familiarity with the test material. Ratio formulae used to determine rate variability have used the nebulous term "normal reading rate" as the base reading rate from which to judge other reading rates when material difficulty levels and reader's purpose have been changed. No study reviewed reported an allowance for intelligence levels in either their materials and/or test instruments used. Perhaps the fault found with reading flexibility studies reviewed was the absence of clearly stated operational definitions of reading flexibility, reader's purpose and material difficulty.

CHAPTER III

PERSONNEL AND PROCEDURES

Introduction

This chapter will describe the reading flexibility program, the population selected for the study, the test used to measure reading flexibility, and the statistical methods used to test the significance of the test results.

The Reading Flexibility Program

The Reading Flexibility Program consisted of forty-five reading selections. The selections were adapted by the experimenter from magazines, United States Air Force correspondence course materials as well as from commercially prepared reading improvement programs. Articles were selected on the basis of interest, compatability with study type materials, concept development and literary style. Both expository and literary type selections in the areas of science, history, literature and sociology were used as the principal themes of the experimental volume. Each individual reading exercise was preceded by a statement of purpose for which the selection was to be read by the subject. The purposes were as follows: (1) determine the main idea; (2) draw inferences; (3) locate specific facts; (4) sequence events; and (5) to solve a problem. All exercises were followed by a comprehension exercise

designed to measure the reader's response to the pre-stated purpose of the unit.

With the exception of the commercially prepared materials all of the experimental reading selections were re-written to either the eighth grade or the sixth grade-seventh grade level of difficulty. The Dale-Chall Readability Formula was used to establish the grade level of difficulty of the materials. These levels were chosen because they were two grade levels below the instructional reading level of each of the performance groups. The eighth grade materials were given to the high performance group because these subjects were reading at or above the tenth grade level of reading as measured by the Nelson-Denny Reading Test. The sixth grade reading materials were given to the low performance group because subjects in this group were reading below the tenth grade level of reading and at or above the seventh grade level of reading as measured by the Nelson-Denny Reading Test. The material was written two grade levels below the measured reading levels of the subjects so that word recognition and comprehension problems would not interfer with the reader's performance and achievement.

Unit themes, purposes and grade level difficulty as determined by the Dale-Chall Reading Formula are listed in Table II.

Instruction in the Reading Improvement Program consisted of nineteen, fifty-six minute class periods conducted between November 22 and December 20, 1971. Subjects were given two exercises per class period for the first twelve days of the experiment and three exercises per class period for the remaining seven days of the experiment. This procedure was necessitated by the school calendar and its effect in making a homogeneous group available for the experiment.

TABLE II

READING FLEXIBILITY PROGRAM MATERIALS

Number	Theme	Purpose	Average Level of Difficulty	
			Eighth Grade	Sixth Grade
15	Science	Draw Inferences Locate a Specific Fact Sequence Events Solve a Problem	8.2 - 9.8	6.4 - 7.7
9	History	Main Idea Sequence Events	8.0 - 9.5	6.0 - 7.2
8	Literature	Main Idea Draw Inferences Sequence Events	8.0 - 9.5	6.0 - 6.9
7	Education	Main Idea Draw Inferences	8.4 - 9.5	6.5 - 7.7
6	Sociology	Main Idea Draw Inferences Sequence Events	8.4 - 9.5	6.2 - 7.4

A graduate assistant from the Oklahoma State University Reading Center was employed to teach the use of the experimental materials to the study's experimental population. The control population received the same experimental materials, but they received no instruction in their use other than that provided by the materials themselves.

Population

The population of this study was drawn from the sophomore English classes attending Drumright High School, Drumright, Oklahoma. The entire sophomore class was administered the Nelson-Denny Reading Test (Form A) to determine the reading ability of each member of the population. After the test was scored the population was divided into "High Performance" and "Low Performance" groups. Subjects assigned to the "High Performance" group were those scoring above the fifty-fifth percentile on the tenth grade norms of the Nelson-Denny Reading Test. Subjects assigned to the "Low Performance" group were those scoring below the forty-fifth percentile on the Nelson-Denny Reading Test's tenth grade norms.

Using the results from the Nelson-Denny Reading Test the students were rank ordered and assigned numbers ranging from one to eighty. The subjects were then randomly assigned to either the experimental or control groups.

Of the eighty students screened for the experiment, sixty-four were selected for testing the hypotheses stated in Chapter I. Table III shows the composition of the experimental and control groups.

TABLE III

COMPOSITION OF EXPERIMENTAL AND CONTROL GROUPS

Group	Male	Female	Mean Age	Nelson-Denny Mean Raw Score
High Experimental	6	10	15 yrs, 6 mos	72
High Control	8	8	15 yrs, 7 mos	67
Low Experimental	8	8	15 yrs, 9 mos	39
Low Control	6	10	15 yrs, 7 mos	33

Instrument Used in Study

The Reading Versatility Test--Intermediate Level (Form A) was used in this study for the following reasons: (1) it is a power test. McDonald (1966) states, "It is a power test in that it is timed but does not have a time limit, and as a result it gives a truer indication of a student's reading ability in a given reading situation." (2) It is a standardized reading flexibility test. The norming procedures are described below. (3) It measures the principal types of reading a student is called upon to perform in the classroom, i.e., recreational, study, skimming for main ideas, and scanning for specific facts.

The Reading Versatility Test was originally written by Arthur S. McDonald, et al, and published in 1962 by Educational Developmental Laboratories. The 1962 version had two levels. The Basic Level was for use in grades six through ten, and the Advanced Level for use in grades eleven through college. The Reading Versatility Test was revised in 1968. The revised edition contains three levels. They are: (1) the revised Basic Level for use in grades five through eight; (2) the new Intermediate Level for use in grades eight through twelve; and (3) the revised Advanced Level for use in grade twelve through college.

Whereas the original edition contained five sub-tests, the revised edition contains only four sub-tests. A brief description of each subtest and its purpose follows:

1. Normal rate--a fiction selection in which the reader is directed to read as if time were short, with attention directed to important facts, main ideas, and implications.

2. Study rate--a non-fiction selection requiring careful, thoughtful reading with attention to detail, main ideas and implications.
3. Skimming rate--a selection in which the reader skims in order to answer questions dealing only with the more important ideas.
4. Scanning rate--a selection which the reader scans to enable him to answer a question provided in advance of the reading.

The reading of each selection is timed, and since the reader is directed to take as much time as he needs, the resulting rate measurement and the ratio among the parts provide measures of reading flexibility.

The normative population of the revised forms of the Reading Versatility Test with their reliability coefficients is listed in Table IV.

The above reliability coefficients reflect the degree of consistency of measurement. They are based on the "back to back" administration of alternate forms at each level and were computed using product moment correlations. An Analysis of Variance controlling for difference in reading ability as shown by the Diagnostic Reading Test--Survey Section and the Reading Versatility Test yielded a Rho correlation coefficient of .88.

The mean validity for the Reading Versatility Test--Intermediate Level is reported by its authors to be .78.

> Reading materials used in the test were selected on the basis of criteria of type range and content actually used at the level being tested. Each selection used was evaluated for reading difficulty by the Flesch and Dale-Chall formula. These were held constant to minimize differential effect of interest and/or background knowledge.

Form A of the Reading Versatility Test--Intermediate Level was administered to the sample population on December 22, 1971, the day after they had completed the forty-five experimental reading selections.

TABLE IV

NORMATIVE POPULATION AND RELIABILITY COEFFICIENTS OF THE READING VERSATILITY TEST

Group	Level	N	Part 1	Part 2	Parts 3-4
Psychology Students	Adv.	340	.85	.82	.55
General College Students	Adv.	2420	.87	.84	.65
Graduate Students	Adv.	300	.86	.89	.65
Adults	Adv.	300	.90	.88	.70
Fifth-Sixth Grade Students	Basic	420	.89	.87	.59
Seventh-Eighth Grade Students	Inter.	780	.84	.80	.51
Tenth-Twelfth Grade Students	Adv.	2040	.88	.83	.55

Statistical Design

The statistical method selected for the testing of the hypotheses listed in Chapter I was a two-by-two factorial analysis of variance design. This procedure allowed for analysis of the independent and interactive effects of the independent variables of high performance and low performance groups, and instruction and no instruction groups--on the dependent variable rate of reading.

This statistical design is described by Kerlinger (1964), Bruning and Kintz (1968), Lindquist (1966), and Dayton (1970).

Reading rate scores for each purpose as well as the difference between the rate scores of Part 1 and each of the other parts of the Reading Versatility Test were analyzed using the factorial analysis of variance cited above. Hypotheses whose F ratios were significant at the .05 level of confidence were rejected.

For purposes of this study the data was analyzed using the Biomedical and Computer Programs, BMD02V program (Dixon, 1970) in conjunction with the Oklahoma State University Computer Center's IBM 360/65 computer.

Summary

This chapter has described the Reading Flexibility Program, the sample selected for the study, the test used to measure reading flexibility and the statistical methods used to test the significance of differences between the experimental and control groups as well as differences between the high and low performance groups.

The sixty-four subjects were divided into four groups, representing high performance, experimental and control groups; and low performance, experimental and control groups.

The measuring instrument was the Reading Versatility Test--Intermediate Level (Form A), which was chosen because it was the only standardized instrument available that was specifically designed to measure reading rate variability when reading different purposes.

The statistical method used to analyze the data was a factorial analysis of variance design. It allowed for the determination of

significant differences between ability groups, and interaction between treatments and groups.

CHAPTER IV

TREATMENT OF DATA AND ANALYSIS OF RESULTS

Introduction

The purpose of the study was to evaluate the effectiveness of a structured, directed reading improvement program in the development of reading flexibility skills by sophomore high school students. Two major questions and their related hypotheses were investigated by the experimenter to determine the program's effectiveness. This chapter will report the results of the study.

Test Results

The Reading Versatility Test is composed of four sub-tests. Each of the sub-tests measures reading rate for a specific purpose. Part 1, by definition is normal reading rate; Part 2 is study reading rate; Part 3 is reading rate when skimming for main ideas; and Part 4 is reading rate when scanning for a specific fact. The mean reading rate scores achieved by each of the four sub-groups, for each part of the test are shown in Table V.

One method of determining reading flexibility on the basis of mean reading rate scores for the different tests is to establish ratios between the normal mean reading rate score and each of the other mean rate scores. McDonald (1968) states,

> On the various levels of the Reading Versatility Tests, a skillful task-oriented reader will read the fiction selection (Part 1) about 1.5 to 2 times as fast as he reads the non-fiction selection (Part 2). He will skim Part 3 about 1.5 to 2 times as fast as he reads Part 1. He will scan Part 4 about 2 to 3 times as fast as he reads Part 1.

Ratios Between Part 1 and the other parts of the test are shown in Table VI.

TABLE V

READING RATE MEAN SCORES WHEN READING FOR SPECIFIC PURPOSES

Group	Part 1 Normal Reading Rate	Part 2 Study Reading Rate	Part 3 Skimming Rate	Part 4 Scanning Rate
High Experimental	191.00000	176.68750	338.06250	594.81250
High Control	199.87500	186.00000	308.37500	549.18750
Low Experimental	122.37500	122.68750	179.50000	246.56250
Low Control	118.56250	115.43750	208.56250	290.37500

The data in Table VI show that none of the four groups made an adjustment between their reading rates on parts one and two of the Reading Versatility Test. All but the Low Experimental group made adjustments between parts one and three and all groups made adjustments in their reading rate between parts one and four.

While the ratios do show a change in reading behavior they do not indicate the degree of significance to which the experimental and control groups altered their behavior when reading for different purposes.

Therefore, the reading rates for each purpose as well as the difference between the rates for each part of the test were analyzed using a factorial analysis of variance statistical technique. Hypotheses whose F ratios were significant at the .05 level of confidence were rejected.

TABLE VI

READING RATE RATIOS BETWEEN NORMAL READING RATE AND STUDY READING RATE; SKIMMING READING RATE; AND SCANNING READING RATE

Group	Part 1:Part 2	Part 3:Part 1	Part 4:Part 1
High Experimental	1 : 1	1.7 : 1	3 : 1
High Control	1 : 1	1.5 : 1	2.7 : 1
Low Experimental	1 : 1	1 : 1	2 : 1
Low Control	1 : 1	1.7 : 1	2.4 : 1

Hypothesis A-1: There is no significant difference between the experimental group and the control group mean scores on tests measuring reading rate when reading for important facts, main ideas and implications. The findings relative to this hypothesis are shown in Table VIII.

The F ratio, .02167, between the experimental group and the control group means on tests measuring normal reading rate when reading for important facts, main ideas and implications was not significant at the .05 level of confidence. Hypothesis A-1 cannot be rejected. The F ratio, 19.01410, between the high performance group's and the low

performance group's mean reading rate on part one of the Reading Versatility Test was significant at the .001 level of confidence.

TABLE VII

ANALYSIS OF VARIANCE OF NORMAL READING RATE SCORES WHEN READING FOR IMPORTANT FACTS, MAIN IDEAS AND IMPLICATIONS

Source	Sums of Squares	df	Mean Squares	F	p
Total	374434.12500	63			
Treatments	102.51563	1	102.51563	.02167	
Levels	89925.00000	1	89925.00000	19.01410	<.001
Treatments x Levels	643.50000	1	643.50000	.13606	
Within	283763.12500	60	4729.38281		

Hypothesis A-2: There is no significant difference between the experimental group and the control group mean scores on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications. This hypothesis was concerned with the subject's ability to "slow" his reading rate down in order to fully comprehend the test material. It differs from the purpose of normal reading rate in that it requires the reader to try to completely understand the material presented, whereas the normal reading rate purpose for reading only requires the reader to be familiar with the material.

Table VIII presents data relative to this hypothesis.

TABLE VIII

ANALYSIS OF VARIANCE OF STUDY READING RATE SCORES WHEN READING FOR IMPORTANT FACTS, MAIN IDEAS AND IMPLICATIONS

Source	Sums of Squares	df	Mean Squares	F	p
Total	249045.18750	63			
Treatments	17.01563	1	17.01563	.00549	
Levels	62063.26563	1	62063.26563	20.03460	<.001
Treatments x Levels	1096.65625	1	1096.65625	.35401	
Within	185868.25000	60	3097.80396		

Instruction did not produce a significant difference between the experimental and control group mean scores on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications. The F ratio of .00549 is not significant at the .05 level of confidence. Hypothesis A-2 cannot be rejected. The high performance group was superior to the low performance group on the words-per-minute measure. The F ratio between the two groups was 20.03460 and was significant at the .001 level of confidence.

Hypothesis A-3: There is no significant difference between the experimental group and the control group mean scores on tests measuring reading rate when skimming for important ideas. Results of the test

measuring the skimming rate are presented in Table IX.

TABLE IX

ANALYSIS OF VARIANCE OF READING RATE SCORES WHEN SKIMMING FOR MAIN IDEAS

Source	Sums of Squares	df	Mean Squares	F	p
Total	1627829.00000	63			
Treatments	1.56250	1	1.56250	.00006	
Levels	267030.56250	1	267030.56250	11.89451	<.005
Treatments x Levels	13803.87500	1	13803.87500	.61487	
Within	1346993.00000	60	22449.88281		

Hypothesis A-3 cannot be rejected because the F ratio between the experimental and control groups is only .00006, not significant at the .05 level of confidence. The obtained F ratio of 11.89451 between the high performance and low performance group on the words-per-minute scale is significant at the .005 level. This represents the lowest difference between the high performance group and the low performance group on the words-per-minute measurement.

Hypothesis A-4: There is no significant difference between the experimental group and the control group mean scores on tests measuring reading rate when scanning for a specific fact. Data on which conclusions relative to this hypothesis are based are shown in Table X.

Instruction produced no significant differences between the experimental and the control groups' mean reading rate scores on tests measuring reading rate when scanning to locate a specific fact. The F ratio between the two groups was .00019 and was not significant at the .05 level of confidence. Mean reading rate scores of the high performance and the low performance group on the scanning test were significantly different at the .001 level. The F ratio between ability levels for reading rate was 21.82708.

TABLE X

ANALYSIS OF VARIANCE OF READING RATE SCORES WHEN SCANNING FOR A SPECIFIC FACT

Source	Sums of Squares	df	Mean Squares	F	p
Total	5558226.00000	63			
Treatments	13.14063	1	13.14063	.00019	
Levels	1474099.00000	1	1474099.00000	21.82708	<.001
Treatments x Levels	31995.00000	1	31995.00000	.47375	
Within	4052119.00000	60	67535.31250		

The obtained F ratios pertinent to the hypotheses concerning the effect of instruction on reading rate flexibility show that instruction did not, in this study, produce any significant variation in reading rate between the experimental and control groups. The significant

differences obtained between high performance and low performance groups on the words-per-minute scale was expected, and can be explained in terms of general reading ability as measured by the Nelson-Denny Reading Test. The more able readers, in this study, entered the training period with superior reading skills and maintained that superiority through the course of instruction.

What level of reader will vary his reading rate the most as a result of participation in the structured, directed reading improvement program? In order to verify or reject the hypotheses relative to this question it was first necessary to compute the rate differences between Part One and each of the other three parts of the Reading Versatility Test, and then analyze the mean difference scores by a factorial analysis of variance statistical technique. Table XI shows the mean difference scores between the various parts of the Reading Versatility Test.

TABLE XI

MEAN RATE DIFFERENCES BETWEEN PART ONE AND PARTS TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

Group	Part 1 - Part 2	Part 1 - Part 3	Part 1 - Part 4
High Experimental	14.312	-147.062	-403.813
High Control	13.875	-108.750	-349.312
Low Experimental	-0.313	-56.500	-124.187
Low Control	3.125	-85.625	-171.812

With the exception of the Low Experimental group's mean rate difference score between part one and part two of the Reading Versatility Test the other groups' mean rate difference scores show expected trends when parts two, three and four are subtracted from part one of that test. The negative score for the Low Experimental group in this comparison shows that this group increased their study reading rate instead of decreasing it as was expected. Negative mean difference scores for all groups in the last two comparisons listed on Table XI show that the four groups increased their reading rate when skimming for main ideas and scanning for a specific fact. The degree of significance by which each group increased their reading rate is shown in the tables that follow.

Mean rate difference as it is used in the following hypotheses will refer to the difference between the Reading Versatility Test subtest listed in the hypothesis and part one of that test.

Hypothesis B-1: There is no significant difference in mean rate difference scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications. Findings relative to this hypothesis are presented in Table XII.

There is no significant difference between the high performance group and low performance group mean rate difference scores on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications. The F ratio, 1.02548, is not significant at the .05 level of confidence. The hypothesis cannot be

rejected. Earlier it was reported that the high performance group read both the normal reading material and study reading material at a significantly higher rate than did the low performance group. When reading rate is not considered, the high performance group did not vary their reading rate between normal reading situations and study situations any more than did the low performance group.

TABLE XII

ANALYSIS OF VARIANCE OF DIFFERENCE BETWEEN NORMAL READING RATE FOR IMPORTANT FACTS, MAIN IDEAS AND IMPLICATIONS AND STUDY READING RATE FOR IMPORTANT FACTS, MAIN IDEAS AND IMPLICATIONS

Source	Sums of Squares	df	Mean Squares	F	p
Total	153366.00000	63			
Treatments	36.00000	1	36.00000	.01433	
Levels	2575.56250	1	2575.56250	1.02548	
Treatments x Levels	60.68750	1	60.68750	.02416	
Within	150693.75000	60	2511.56250		

Hypothesis B-2: There is no significant difference in mean rate difference scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when skimming

for main ideas. Findings relative to this hypothesis are presented in Table XIII.

TABLE XIII

ANALYSIS OF VARIANCE OF DIFFERENCE BETWEEN NORMAL READING RATE FOR IMPORTANT FACTS, MAIN IDEAS AND IMPLICATIONS AND SKIMMING RATE FOR MAIN IDEAS

Source	Sums of Squares	df	Mean Squares	F	p
Total	1125133.00000	63			
Treatments	337.64063	1	337.64063	.01920	
Levels	51699.39063	1	51699.39063	2.94049	
Treatments x Levels	18184.96875	1	18184.96875	1.03430	
Within	1054911.00000	60	17581.84766		

The F ratio, 2.94094, between the high performance group and low performance group mean rate difference socres on tests measuring reading rate when skimming for main ideas is not significant at the .05 level. Therefore, Hypothesis B-2 cannot be rejected. The high performance group's mean reading rate score on this part of the Reading Versatility Test was significantly better than the low performance group at the .005 level of confidence, but when rate differences between the normal reading rate and skimming reading rate are compared the high performance group did not achieve any more of a rate increase

in their reading rate than did the low performance group.

Hypothesis B-3: There is no significant difference in the mean rate difference scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when scanning for a specific fact. Findings relative to this hypothesis are presented in Table XIV.

TABLE XIV

ANALYSIS OF VARIANCE OF DIFFERENCE BETWEEN NORMAL READING RATE FOR IMPORTANT FACTS, MAIN IDEAS AND IMPLICATIONS AND SCANNING RATE FOR A SPECIFIC FACT

Source	Sums of Squares	df	Mean Squares	F	p
Total	4143338.00000	63			
Treatments	189.06250	1	189.06250	.00347	
Levels	835853.06250	1	835853.06250	15.35749	<.001
Treatments xLevels	41712.87500	1	41712.97500	.76640	
Within	3265583.00000	60	54426.38281		

The difference between the high performance group's mean rate difference score and the low performance group's mean rate difference score was significant at the .001 level of confidence. The F ratio, 15.35749, between the two groups on this sub-test was the only

significant difference obtained between the high performance group and low performance group when mean rate differences were compared. On the basis of this finding Hypothesis B-3 is rejected.

Summary

The high performance group's reading rate was superior to the low performance group's mean reading rate on all four sections of the Reading Versatility Test. The difference between the two groups' mean reading rate was significant at the .001 level on tests measuring normal reading rate when reading for important facts, main ideas and implications; study reading rate when reading for complete understanding of main points, facts, ideas and implications; and reading rate when scanning for a specific fact. The difference between the high performance group's mean reading rate and the low performance group's mean reading rate was significant at the .005 level of confidence on tests measuring reading rate when skimming for main ideas.

Instruction in the use of the Reading Flexibility Program materials produced no significant differences between the experimental group and control group mean reading rate scores.

When comparisons were made between the high performance group and low performance group mean rate difference scores only one significant difference was obtained. The difference between the high performance group and low performance group mean rate difference score on tests measuring reading rate when scanning for a specific fact was significant at the .001 level of confidence. The two group's mean rate difference scores on tests measuring normal reading rate when reading for important facts, main ideas and implications; study reading rate when reading for

complete understanding of main points, facts, ideas and implications; and reading rate when skimming for main ideas were not significantly different.

On the basis of these findings the following hypothesis was rejected:

There is no significant difference in the mean rate difference scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when scanning for a specific fact.

The following hypotheses could not be rejected:

(1) There is no significant difference between the experimental group and the control group mean scores on tests measuring normal reading rate when reading for important facts, main ideas and implications.

(2) There is no significant difference between the experimental and the control group mean scores on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications.

(3) There is no significant difference between the experimental and the control group mean scores on tests measuring reading rate when skimming for important ideas.

(4) There is no significant difference between the experimental and the control group mean scores on tests measuring reading rate when scanning for a specific fact.

(5) There is no significant difference in the mean rate difference scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny

Reading Test on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications.

(6) There is no significant difference in mean rate difference scores made by students falling below the median on the Nelson-Denny Reading Test and students falling above the median on the Nelson-Denny Reading Test on tests measuring reading rate when skimming for main ideas.

CHAPTER V

SUMMARY AND CONCLUSIONS

General Summary of the Investigation

This study examined the effectiveness of a reading program designed to develop reading flexibility skills of sophomore students attending Drumright High School, Drumright, Oklahoma. Two major questions and their related hypotheses were considered and analyzed to determine the effect of the reading flexibility program. The questions considered were: Does a structured, directed reading flexibility program materially improve the reading flexibility skills of sophomore students, i.e., will participation in the program effect reading flexibility on tests designed to measure reading rate variation when reading for the following purposes: (1) normal reading rate when reading for important facts, main ideas and implications; (2) study reading rate when reading for complete understanding of main points, facts, ideas, and implications; (3) reading rate when skimming for main ideas only; and (4) reading rate when scanning for a specific fact? Will a high performance reader gain more from the reading flexibility program than a low performance reader? Null hypotheses that no difference existed between experimental and control groups as well as between the high performance group and the low performance group were used to examine the results obtained from the Reading Versatility Test.

The sample used in the study was chosen from the sophomore class of Drumright High School, Drumright, Oklahoma. Of the eighty students who took the Nelson-Denny Reading Test, sixty-four were selected for study and evaluation. Thirty-two students who scored above the fifty-fifth percentile on the screening test were assigned to the High Performance group and the remaining thirty-two, who had scored below the forty-fifth percentile on the screening test, were assigned to the Low Performance group. The high and low performance groups were divided into experimental and control groups to measure the effects of the forty-five unit reading flexibility program. The selections for the reading program were structured, in that each unit has a specific purpose for which it was to be read. Both experimental and control groups received the same reading exercises, but the experimental group also received instruction in the use of the material from a reading teacher. At the end of the reading flexibility program all subjects were given the Reading Versatility Test to measure their reading rate variability when reading for different purposes.

Summary of Results

Comparison of mean rate reading scores of the experimental group and the control group shows that the experimental group did not achieve any more flexibility in its reading rates than did the control group. None of the F ratios between the experimental group mean and control group mean rate reading scores exceeded 1.0. For an F ratio with one degree of freedom over sixty degrees of freedom to be significant at the .05 level of confidence it must be at least 4.00. F ratios between experimental group and control group mean rate scores on Part 1, normal

reading rate when reading for important facts, main ideas and implications; Part 2, study reading rate when reading for complete understanding of main points, facts, ideas and implications; Part 3, reading rate when skimming for main ideas; and Part 4, reading rate when scanning for a specific fact are shown in Table XV.

TABLE XV

F RATIOS BETWEEN EXPERIMENTAL GROUP AND CONTROL GROUP MEAN READING RATE SCORES ON PARTS 1, 2, 3 AND 4 OF THE READING VERSATILITY TEST

Part	F Ratio
Part 1	F = .01267
Part 2	F = .00549
Part 3	F = .0006
Part 4	F = .00019

Instruction in the use of the reading flexibility material did not give any advantage to the experimental group. The performance of the control group may be explained by the fact that all of the reading flexibility program's units contained pre-stated purposes and methods the students could use to meet the purpose of the reading exercise. The low F ratios between the experimental group and the control group mean rate scores indicate that the control subjects obtained enought

information from the pre-reading exercises to read a given piece of material as effectively as did the experimental group who had received instruction. This finding is consistent with those of Berger and Braam (1966), Smith (1966), Levine (1966), and Metsker (1966).

The mean reading rates of the high performance and low performance groups were significantly different at the .05 level of confidence or better on all sub-tests of the Reading Versatility Test. The superior reading rate scores of the high performance group were expected. The subjects in the high performance group entered the experiment with reading skills superior to the low performance group and maintained that superiority throughout the experiment.

A comparison of the mean rate difference scores between the high performance group and the low performance group shows that while the high performance group read all selections at a faster rate than did the low performance group, the high performance group varied its reading rate at a significant level on only one of the three comparisons made between it and the low performance group. Table XVI shows the F ratios between the high performance group and low performance group mean rate difference scores.

There were no significant differences between the mean rate difference scores of the high performance group and the low performance group when study reading rate and reading rate when skimming for main ideas were compared with the normal reading rate of the two groups. The data indicate that high ability readers, examined in this study, were no more able to vary their reading rates for the purposes listed than were the low ability readers. The difference between the high performance group and low performance group when reading rate when

scanning for a specific fact was compared with normal reading was significantly different at the .001 level of confidence. The normal reading rate of the high performance group was significantly superior to the normal reading rate of the low performance group. This fact coupled with the significant difference between the mean rate difference scores of the two groups shows that the high performance group was able to increase their already superior reading rate to a greater extent than was the low performance group on tests measuring reading rate when scanning for a specific fact.

TABLE XVI

F RATIOS BETWEEN HIGH PERFORMANCE GROUP AND LOW PERFORMANCE GROUP MEAN RATE DIFFERENCE SCORES BETWEEN PART ONE AND PARTS TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

Comparison	F Ratio	p
Part One : Part Two	F = 1.02548	
Part One : Part Three	F = 2.94049	
Part One : Part Four	F = 15.35749	<.001

With the exception of the achievement of the high performance group on tests measuring reading rate when scanning for a specific fact, good readers, in this study, did not vary their reading rate for different purposes any more than did poor readers. This finding is

consistent with those of Levine (1966).

The results of this study support those reported earlier. This study indicated that reading flexibility skills were not present in the subjects studied and that reading flexibility training did not produce reading flexibility in the reading behavior of the subjects examined. The fact that subjects receiving instruction in the use of the reading flexibility materials did not perform significantly better than did those subjects not receiving instruction may be explained by the nature of the reading flexibility materials used in the study. Each of the units of instruction in the experimental volume was preceded by a statement of purpose for which the exercise was to be read, and methods that could be employed in the attainment of that purpose. It is hypothesized that the control subjects derived enough information from the pre-reading sections to off-set any advantage the experimental subjects may have received from instruction in the use of the materials.

Subjects with high reading ability did not vary their reading rate any more than did students with low reading ability on tests measuring reading rate when reading for complete understanding of main points, facts, ideas and implications and tests measuring reading rate when skimming for main ideas. There was a significant difference between the mean rate difference score of the high performance group and the mean rate difference score of the low performance group on tests measuring reading rate when scanning for specific facts.

Summary

It appears that flexibility of reading rate is an independent quality, which bears little relationship to reading rate and

comprehension as measured by a standardized test of general reading ability. It follows, then, that high scores on standardized reading tests are no guarantee of flexibility of reading rate.

Recommendations

The results of this study emphasize the need for further research in the areas of measurement and development of reading flexibility skills. Studies in the following areas of reading flexibility are recommended:

1. Studies to isolate the factors effecting the performance of readers in different reading situations.

2. Studies designed to determine the effect of material difficulty and purpose on reading flexibility in specific subject matter areas.

3. Studies to determine the influence of purpose on materials containing varying difficulty levels.

4. Studies to determine methods of teaching flexibility of reading rate in specific content areas.

5. Studies to determine the instructional level to begin reading flexibility training.

Implications for Education

Since flexibility of reading rate apparently does not inevitably accompany good reading, there is a need for instruction in adapting reading rate to material difficulty and purpose of reading. Results of this study point to the fact that the high performance readers and low performance readers both could profit from such instruction.

Concluding Statement

The results of this study are offered as an attempt to aid in the development of reading flexibility instructional programs. It is hoped that the results may be useful in guiding the development of future research studies in the area of reading flexibility.

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APPENDIX A

DISTRIBUTION OF READING RATE SCORES OF HIGH EXPERIMENTAL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

TABLE XVII

DISTRIBUTION OF READING RATE SCORES OF HIGH EXPERIMENTAL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

Subject	Part One	Part Two	Part Three	Part Four
1	145	140	210	1050
2	150	127	247	467
3	210	133	300	382
4	140	156	156	420
5	210	183	191	350
6	140	145	323	280
7	183	135	162	700
8	135	124	420	840
9	323	233	280	600
10	300	350	1050	1400
11	156	150	233	280
12	150	221	420	382
13	162	124	420	525
14	280	210	382	600
15	210	191	382	1050
16	162	105	233	191

APPENDIX B

DISTRIBUTION OF READING RATE SCORES OF HIGH CONTROL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

TABLE XVIII

DISTRIBUTION OF READING RATE SCORES OF HIGH CONTROL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

Subject	Part One	Part Two	Part Three	Part Four
17	233	300	168	382
18	280	191	467	323
19	175	135	467	420
20	145	145	191	350
21	200	221	221	525
22	168	300	600	1050
23	145	103	191	382
24	120	117	135	168
25	175	168	183	420
26	135	135	191	191
27	600	350	600	1400
28	127	100	156	323
29	150	191	150	263
30	221	221	467	840
31	156	131	280	1050
32	168	168	467	700

APPENDIX C

DISTRIBUTION OF READING RATE SCORES OF LOW EXPERIMENTAL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

TABLE XIX

DISTRIBUTION OF READING RATE SCORES OF LOW EXPERIMENTAL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

Subject	Part One	Part Two	Part Three	Part Four
33	74	103	135	103
34	78	82	103	150
35	111	108	145	323
36	175	114	247	210
37	117	84	150	247
38	168	150	280	221
39	120	124	150	108
40	127	111	150	168
41	100	117	103	350
42	131	127	150	420
43	70	70	150	280
44	120	124	210	210
45	156	183	263	175
46	93	79	183	467
47	162	140	210	133
48	156	247	243	280

APPENDIX D

DISTRIBUTION OF READING RATE SCORES OF LOW CONTROL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

TABLE XX

DISTRIBUTION OF READING RATE SCORES OF LOW CONTROL GROUP ON PARTS ONE, TWO, THREE AND FOUR OF THE READING VERSATILITY TEST

Subject	Part One	Part Two	Part Three	Part Four
49	75	75	103	210
50	114	93	263	382
51	86	91	103	124
52	168	111	140	350
53	79	91	156	120
54	79	82	140	105
55	105	124	210	280
56	156	124	233	210
57	127	108	135	300
58	127	191	525	600
59	95	105	221	247
60	124	111	420	323
61	124	103	156	247
62	162	145	210	300
63	145	131	191	323
64	131	162	131	525

APPENDIX E

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE HIGH EXPERIMENTAL GROUP ON THE READING VERSATILITY TEST

TABLE XXI

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE HIGH EXPERIMENTAL GROUP ON THE READING VERSATILITY TEST

Subject	Part 1 : Part 2	Part 1 : Part 3	Part 1 : Part 4
1	5	-75	-905
2	23	-97	-317
3	-23	-90	-172
4	-16	-16	-280
5	27	19	-140
6	-5	-183	-140
7	48	21	-517
8	11	-285	-705
9	90	43	-277
10	-50	-750	-1100
11	6	-77	-124
12	-71	-270	-232
13	38	-258	-363
14	70	-102	-320
15	19	-172	-840
16	57	-71	-29

APPENDIX F

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE HIGH CONTROL GROUP ON THE READING VERSATILITY TEST

TABLE XXII

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE HIGH CONTROL GROUP ON THE READING VERSATILITY TEST

Subject	Part 1 : Part 2	Part 1 : Part 3	Part 1 : Part 4
17	-67	65	-149
18	89	-187	-43
19	40	-292	-245
20	0	-46	-205
21	-21	-21	-325
22	-132	-432	-882
23	42	-46	-237
24	3	-15	-48
25	7	-12	-245
26	0	-56	-56
27	25	0	-8
28	27	-29	-196
29	-41	-	-113
30	0	-246	-619
31	25	-124	-894
32	0	-299	-532

APPENDIX G

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE LOW EXPERIMENTAL GROUP ON THE READING VERSATILITY TEST

TABLE XXIII

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE LOW EXPERIMENTAL GROUP ON THE READING VERSATILITY TEST

Subject	Part 1 : Part 2	Part 1 : Part 3	Part 1 : Part 4
33	-29	-61	-29
34	-4	-25	-72
35	3	-34	-212
36	61	-62	-35
37	33	-33	-130
38	18	-112	-53
39	-4	-30	12
40	16	-23	-41
41	-17	-3	-250
42	4	-19	-289
43	0	-80	-210
44	-4	-90	-90
45	-27	-107	-19
46	14	-90	-374
47	22	-48	-71
48	-91	-87	-124

APPENDIX H

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE LOW CONTROL GROUP ON THE READING VERSATILITY TEST

TABLE XXIV

DISTRIBUTION OF RATE DIFFERENCE SCORES OF THE LOW CONTROL GROUP ON THE READING VERSATILITY TEST

Subject	Part 1 : Part 2	Part 1 : Part 3	Part 1 : Part 4
49	0	-28	-135
50	11	-149	-268
51	5	-17	-38
52	57	28	-182
53	-12	-77	-41
54	-3	-61	-26
55	-19	-105	-175
56	32	-7	-54
57	19	-8	-173
58	-64	-398	-473
59	-10	-126	-152
60	13	-296	-199
61	21	-32	-123
62	17	-48	-138
63	14	-46	-178
64	-31	0	-394

VITA

Bruford Leo Doyle

Candidate for the Degree of

Doctor of Education

Thesis: AN INVESTIGATION OF READING FLEXIBILITY

Major Field: Higher Education

Biographical:

Personal Data: Born at Albuquerque, New Mexico, May 18, 1935, the son of Frank L. and Laura Lucille Doyle.

Education: Attended St. Mary's elementary and secondary school in Albuquerque, New Mexico; graduated from St. Mary's High School in 1953; received the Bachelor of Arts degree from the University of New Mexico in 1961 with a degree in social studies; attended Oregon College of Education NDEA Summer Institute in American History, 1965; received the Master of Arts degree from the University of New Mexico in June, 1966, with a major in Secondary School Administration; completed requirements for the Doctor of Education degree at Oklahoma State University in May, 1972.

Professional Experience: Entered the United States Air Force Aviation Cadet Pilot Training program in 1956 and was discharged in 1957 with the rank of Second Lieutenant and Aeronautical rating of pilot in 1957; taught 7th and 8th grade social studies, 9th grade speech and journalism courses at Jackson Junior High School, Albuquerque, New Mexico, 1960-1966; served as a graduate assistant at Oklahoma State University, 1966-1968; Co-director NDEA Summer Reading Institute, Oklahoma State University, 1967; re-called to the United States Air Force, 1968, Education and Training Officer, 1968, Academic Programmer, USAF Special Operations School; 1969-1971; worked as a graduate assistant in Oklahoma State University, College of Education during the year of residency.