THE RELATIONSHIP BETWEEN SPEED AND ACCURACY OF COMPREHENSION IN TEACHING READING

by

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Chapter I

INTRODUCTION

Reading is perhaps one of the most vital factors in the life of mankind. The two aspects of reading which receive the most attention are speed and comprehension. There have been many attempts to determine the relationship between these two aspects, speed and comprehension, in the reading process. Hence, various tests have been devised to test either speed and/or comprehension. Speed of reading is, of course, an important factor; however, speed without comprehension is futile. Thus, there has been a growing interest in the study of the reciprocal effect of speed of reading and comprehension.

The question of the relationship of speed of reading and comprehension can probably be summarized thus:

> Is speed of reading a unitary concept that can be adequately coped with in group situations with some pacing device or is it rather a complicated and involved problem that must be resolved for each individual with due consideration to difficulty of materials, types of materials, purposes for reading, and the relative intelligence of the individual? (1, p. 500)

There is general agreement that two important factors in the process of reading are speed and comprehension, there have been many attempts to determine the relationship between speed and comprehension in reading. In the practical

reading situation the important problem is the relationship between rate of comprehension (speed of reading) and degree of comprehension (comprehension score) in a specific reading situation.(2, p. 621) Hence, the relationship between reading rate and comprehension has been extensively studied with widely varying results. These variations are probably due primarily to differences in the methods of measurement employed, or in the manner in which reading rate and comprehension have been defined.(3, p. 449)

Importance of Reading

Reading proficiency is the royal road to knowledge, it is essential to the success in all academic subjects. In modern life, learning depends largely upon one's ability to interpret the printed page accurately and fully.

One educator said, "Reading to me is a way I can find out as much or as little as I choose to know or learn about something. And the more reading, the more learning." (4, p. 4)

Dr. James Conant called reading the keystone of the arch of education. In 1964, Francis Keppel, United States Commissioner of Education, stated the value of reading still more broadly: "Every examination of the problems of our schools, of poverty; every question raised by troubled parents about our schools, every learning disorder seems to show some association with reading difficulty." (5, p. 8)

The introduction to the report of the Carnegie Conference of reading experts included this statement: "Reading is the most important subject to be learned by children; a child will learn little else in today's world if he does not first learn to read properly." (6, p. 1)

Statement of the Problem

The purpose of this study was to describe the relationship between speed and accuracy of comprehension in teaching reading.

Research Questions

The better way to describe the relationship between speed and comprehension to be described and studied, was to ask these questions:

1. What is the relationship of speed reading to accuracy of comprehension when reading for different purposes? Reading is not a unitary skill. "That rate at which a given individual reads depends upon the purpose for which the reading is done," (7, p. 450) and every individual who reads has proved this many times during experiences in reading. It seems to follow logically that no study of the relationship of speed reading and accuracy of comprehension would be comprehensive without varying the purposes for reading.

2. What is the relationship of speed reading to accuracy of comprehension when reading material at varying levels of difficulty? The difficulty of materials does have an influence on the relationship between speed of reading

and accuracy of comprehension. "That the rate at which an individual reads an easy passage may differ considerably from that at which he reads an article of greater difficulty of the same length." (8, p. 452) Hence, certain factors reside in the material. Sentence length and type, vocabulary, organization, and abstractness of the ideas make for ease or difficulty.

3. What is the relationship of speed of reading to accuracy of comprehension when the continuity of materials read is varied? "That is, do interspersed questions disrupting the continuity of the narrative affect the relationship between speed and comprehension." (9, p. 501) That it means if the continuity of materials read influences the relative position of an individual on speed of reading it becomes important to vary that factor in studying the relationships of speed of reading to accuracy of comprehension. Further, in research dealing with educational problems including the various aspects of reading the research worker seeks information that will improve teaching methods and procedures.

Definition of Terms Used

Speed: Speed of reading refers to the number of words read per minute that can be read in a given period of time in accomplishing a given purpose.

Comprehension: Comprehension was considered as the accuracy of response to test items calling for relatively detailed understanding of the reading unit. (10, p. 14)

Chapter II

REVIEW OF RELATED LITERATURE

Reading is not a "lump sum" as many people seem to think. It is a very complex mental process involving many different skills. One of these basic skills is speed. It is the rate with which you can cover printed material through reading. "The basic unit used in measuring speed is the number of words per minute." (11, p. 3) The other basic skill which easily lends itself to measurement is understanding of what is read. This is comprehension. The terms speed and comprehension have special meanings in a reading instruction.

A review of the literature indicates that speed of reading is not a simple unitary concept. The fact that speed of reading is an important and desired outcome of reading instruction goes without saying. But the problems in the measurement of rate stem from the fact that we are never really concerned with pure speed--that is, with just the rapidity with which the subject moves over a given number of words or lines of written materials. Rate is only meaningful as it defines the rapidity with which the reader covers material at a particular level of comprehension. "The question of the relationship of speed and comprehension

is a perplexing one, to which the experimental data gives no single clear cut answer." (12, p. 335)

There seems to be little basis for the often repeated statement that the faster readers are the better comprehenders. The statement may be true under certain conditions. The change of emphasis from intensive to extensive reading has placed a premium upon speed of reading in modern schools nowadays. Further, the constantly enlarging curriculum makes facility in reading a necessity. As a part of the facility speed of reading is, of course, an important factor. However, speed cannot be considered apart from comprehension.

Tinker states,

> Certain writers seem to believe that speed of reading is something which can be divorced from comprehension and still remain a valid measure as recognized, however, with no reference to apprehension of the relationships and the meanings involved, yield a score of little or no significance in the reading situation." (13, p. 559)

In an article by Stolarz on speed reading, the following definition was suggested in terms of a formula: R = K + I. Reading equals the knowledge you bring to the reading plus the increment you get because of what you read. If you are not concerned with the increment, your speed obviously can reach infinity. (14, p. 71)

Russel, "noted that speed and comprehension were positively related in easy reading material. He suggested that this relationship depended upon the measures of speed and comprehension and stated that it decreased for more difficult material." (15, p. 71)

In studying the problems of the relationship of speed and comprehension as the two important variables in reading process some questions present themselves: What is the importance of reading varying difficulty and varying type to the relationship of speed to comprehension? Do various purposes for reading affect the rate a given individual reads? What is the most effective method of teaching comprehension and speed at the elementary levels? This group of questions become in reality controversial questions. The problem has been the subject of much concern.

Schoeller, "reported that the relationship between rate and comprehension of reading was, indeed, a controversial question. He found that Eurich, Traxler, Danners, and Bloomers reported low correlations while Benson, Iverson and Tinker reported high relationships. He concluded from the many studies that rate of reading was really speed or rate of comprehension and that good readers adjusted their rates of reading to the purposes. He further noted that training to improve comprehension did not impede growth in rate of reading, and training in rate of reading did not affect comprehension." (16, p. 71)

Heilman lists the variables that influence the rate at which different materials can be assimilated. These include, difficulty level of words and concepts, reader's purpose, and motivation. (17, p. 287)

S. Jay Samuels said, "The factors which interact to determine reading rate and the relationship between speed and comprehension are the individual's reading style, the difficulty of the material, and the purpose of reading." (18, p. 38)

One might assume that under naturalistic conditions the reader establishes his own purposes for reading and selects the most efficient rate for the material. If the purpose of reading is solely to acquire information and accumulate thought units, then surely speed and efficient comprehension are the essential criteria.

Harker points out that the one perplexing yet common problem facing the teacher is the student who responds to reading assignments by stating, "I read it but I don't understand it." (19, p. 379) What is the most effective method of teaching comprehension at the secondary level? The answer to this question rests on an underlying notion as to what constitutes comprehension. Comprehension is essentially a problem solving process. Thus, the nature of the comprehension task determines the method for solving it, and since no two comprehension tasks are identical, the methods of solutions differ.

Since speed without comprehension is worthless, it is believed that the greater emphasis should always be placed upon comprehension in a reading process. Thus the type, amount, or extent of comprehension demanded of the reader

is also important. Hence, it would be a fallacy to assume that comprehension can be increased if one works on speed alone. Such factors as purpose, background of understanding, and difficulty of material must all be taken into consideration when discussing the relation between speed and comprehension. Several research studies seem to support these ideas.

Jewett and Gunder reported that in a study by Tinker of one hundred high school freshmen to discover the relation of speed of reading to comprehension stated that,

> The relation between speed of work and power of comprehension is determined in some degree by the level of difficulty of the reading material . . . in relatively easy reading, this relation is fairly high, but in more difficulty material the relation is still significant but relatively low to moderate in size. (20, pp. 6-7)

Tinker has concluded, as have others, that the type of purpose required of the reader may influence the relation between rate and power of comprehension. Artley in his report said, "But the rate at which one should read is conditioned by a factor that is even more important than others--the purpose for which one reads." (21, p. 14) Before attempting to read any type of material the reader should always ask himself, "What is my purpose in reading this material?"

Carlson found that the effectiveness of fast and slow readers is dependent on their level of intelligence, their purpose, the difficulty of materials, and the continuity of context. He found that bright, rapid readers are more efficient than slow ones that average and slow readers

comprehend more when they read slowly. Fast readers are not always good readers nor are slow readers necessarily poor readers. (22, p. 512)

Coke (1976) in analyzing relationships in reading rates, studied the effect of different reading strategies on word matching tasks. "Easy texts were read faster than difficult texts. And there was no indication that the word matching task affected reading rate, passage difficulty made no difference on rate in the search condition." (23, pp. 167-173)

After reviewing the literature Gray arrived at the following conclusions:

1. There is positive correlation between speed and comprehension when children read carefully.

2. The degree of correlation varies among school systems, grades and classes.

3. There is some evidence that the correlation between speed and comprehension may be affected by such factors as the difficulty of the passages, the purpose of reading, and the index of comprehension used in correlation studies. (24, p. 124)

Seifert said, "Almost every good basic textbook on reading instruction includes a section or chapter on the 'rate of reading and comprehension.' There seems to be some consensus among the different authors that the rate at which one reads is important and that rates which are too fast or too slow can hinder comprehension." (25, p. 314)

Letson reported in the study of the relative influence of material and purpose on reading rates. "The relation between rate and comprehension is still undetermined. Coefficients of correlation between these two factors vary from -.47 to .92. This relation depends in large part on the measures used." (26 , p. 238) Professor Artley said, "Research shows that the coefficient of correlation between the two factors range from practically zero to around .30." (27, p. 14) Other studies have shown that the relation tends to be higher where easier material is being read, but lower on more difficult material.

A cursory review of the literature seems to present a welter of confusion about the problem of the relationship between speed and comprehension in reading, but research and thought in education still seek a better understanding of the nature of the reading process. This study may make a contribution to this understanding.

Different Approaches Used by Investigators

The relationship between reading rate and comprehension has been extensively studied with widely varying results. The question quite naturally arises as to why the apparent differences in results and conclusions exist among studies. These variations are probably due primarily to differences in the methods of measurement employed, or in the manner in which they have been defined. It is therefore, essential in a relationship study that the purpose of the reading be very carefully defined and controlled. However, in

reviewing the research concerning the problem of the relationship of speed of reading to comprehension, it is helpful to indicate the various approaches that investigators have used in this century.

A criterion often used has been that of correlating scores attained on rate tests with scores attained on comprehension score. (28, p. 9) However, it is obvious that comprehension is to an unknown extent also a rate score since the reader works against time. Paul said, "one of the most obvious limitation in standardized tests of reading comprehension is the fact that they are often 'timed'." (29, p. 158) What we really wish to know is the relationship between the speed at which a person reads and what he gets out of a reading--what he learns.

By second procedure, rate and comprehension scores may be derived from the same operation. (Measures) The number of items attempted constituting the rate score and the number of items responded to correctly constituting the comprehension score. (30, p. 194) This procedure yields a high correlation between the two scores if the tests are reliable. If the test is primarily a speed test, the two scores would tend to be very largely the same scores.

A third approach has been to study the relationship of speed of reading and power of comprehension. The comprehension measure may be derived from the same test or from different tests. (31, p. 10)

The fourth approach also obtains a rate score and a comprehension score from the same measure. However, the factor of speed is removed from the comprehension exercise. (32, p. 10)

The research on the problem of the relationship between speed of reading and accuracy of comprehension will be reviewed according to the methods or procedures that were used in different experiments.

Summary of these approaches:

1. Speed and comprehension scores derived from separate tests.

2. Rate and comprehension scores are measured on identical reading text.

3. Comprehension score is a measure of power of comprehension.

4. Speed and comprehension scores derived from the same test with elimination of the speed factor from the comprehension score.

Speed and Comprehension Scores Derived from Separate Tests

Because of the recent emphasis on reading speed, a number of the survey tests, Burnet Reading Series, and others include some type of comprehension check for two reasons: (1) the belief that faster reading results in better comprehension; (2) the belief that reading speed is unimportant unless some minimal level of comprehension is maintained. (33, p. 45) This approach to the problem relation between

speed and comprehension has been quite popular in that standardized tests are available that yield comprehension and rate of reading scores.

Ralph C. Preston and Morton Botel attempted to check the hypothesis that "when reading comprehension is tested under 'untimed' conditions, rate and quality of reading are unrelated." (34, p. 158) They utilized 32 students in a class. The correlation between rate and untimed comprehension yields a statistically significant coefficient of .48. The correlation between rate and untimed comprehension yields the coefficient of .20--not statistically significant. Eurich in an extensive study of the relationship between speed and comprehension in reading as measured by several reading tests, arrived at the conclusion that the relationship between speed and comprehension is dependent upon the manner in which each is measured. The average of twenty-six correlations reported in this study was .31, which indicates a positive but not close relationship between rate of reading and comprehension (35, p. 406). True comprehension, however, is quite different from such recall, for it involves understanding, selection, correlation, and organization. All of which are influenced by the mental set of the reader.

McBride in his study conducted at Methodist College, Fayetteville, North Carolina, used seventy children divided into eleven groups according to age. All the children were taught rapid reading skills. The program was five

weeks in length. The results taken verbatim from the abstract are as follows:

> The results indicated that children, whether of high or average I.Q., can be taught effectively to read rapidly with a high percentage of comprehension. Children of average intelligence can read as rapidly with good comprehension as those above average in mental ability. Complex comprehension skills showed to better advantage among those of average ability in mentality. Children maturing early mentally and physically made higher scores than others. Girls read faster, but with no better comprehension than boys.

At the beginning of the program the average reading rate was 254 w.p.m. with an average comprehension of 61 percent. At the close of five weeks of classes the average reading rate was 13,244 w.p.m. with an average comprehension of 86 percent. The lowest rate of reading at the close of the program was 720 w.p.m. with 100 percent of comprehension (36, p. 75).

Rate and Comprehension Scores Measured on Identical Reading Text

Speed of reading, for the purpose of this study is considered as the number of words read per minute in accomplishing a given purpose. A study by Flanagan, he collected two scores for subjects on a literary comprehension test: a level of comprehension score and a rate of comprehension score. The level of comprehension score was based on the average number of comprehension items answered correctly on four twenty item scales. The rate of comprehension score was the total number of items answered correctly on all eighty items minus a correction for guessing.

Flanagan computed a positive correlation of .77 between these two scores. Thus indicating a great deal of trait similarity. However, when he correlated a rate of reading score (determined by the total number of items completed within a time limit) with the level of comprehension score, the correlation was only .17 (37, p. 17-21). The belief that reading speed is unimportant unless some minimal level of comprehension is maintained seems quite logical.

Hilliard reported a study of Edith G. Germane at the elementary school level in which she found correlations between speed and comprehension ranging from .20 to .42. Comprehension in this study was checked "by the number of correct answers that were given to questions covering the materials read." She concluded, "that there is a positive correlation between speed and comprehension," and that "some rapid readers are good in comprehension," and that the majority of students who comprehend well are rapid readers and the majority who do not comprehend well are slow readers." (38, p. 22)

In the practical reading situation the important problem is the amount of relationship between rate of comprehension (speed of reading) and degree of comprehension (comprehension score) in a specific reading situation. Therefore, Anderson and Tinker applied the approach at the college level, they used the first five parts of the Iowa Silent Reading Test and these were administered to 110 college sophomores. The time limits were set empirically

so the fastest student could almost but not quite complete each test. The subjects were instructed to work rapidly and consistently, but not to sacrifice accuracy for speed. The correlations between rate of work and "comprehension" when number attempted in standard time was used as the measure of rate of work was +.88 to +.93 to the composite of the five tests. The individual tests yielded correlation coefficients from .68 to .93. (39, p. 621)

In another study as a sequel to the above study Tinker raised the question, whether a change in the difficulty of the test would bring a change in the discovered correlation. The purpose was to investigate the relation between speed and comprehension (1) by measuring rate of work and degree of comprehension on the same or strictly comparable material and (2) by employing as reading material tests ranging from very easy ("no difficulty" level) to extremely difficult material. From easy to difficult tests the mean coefficients when done with strictly comparable material were: .93, .87, .84, .73, .51, and .48. But when comprehension and rate scores were taken from different forms of the tests the uncorrected coefficients are: .83, .69, .62, .59, .42, .42; corected for attenuation: 1.00; .93, .97, .82, .61, .58. This trend seems to indicate a definite relationship between the size of the coefficient and the difficulty level of the reading material. As the material becomes harder, the correlation is lowered.

Tinker gave two factors for explanation of this phenomenon in his study. First, there is the variation in difficulty of the texual material. The degree of accuracy declines consistently from test to test. It seems probable that, as the material gets harder, the consistency of rate of work tends to fluctuate by varying degrees from person to person.

Second, the kind of textbook read may have had an influence. Tinker noted that a decided drop in the coefficients came only with the last two tests. In the first four examinations no special background was essential to an understanding of the material involved. The other two tests, however, did require specialized information for adequate assimulation of the material. He concluded that "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 experiences." (40, p. 81)

Carlson wrote a comment. He said,

> Most of the studies which used this approach in studying the relation of speed to comprehension derived significant correlation coefficient. The significant relationships found are undoubtedly partly due to the fact that the speed factor is operative in the comprehension score arrived at. The number of items correct within a given length of time as the comprehension score places a premium upon speed. Further, the factor of intelligence which is not controlled in any of those studies introduces another factor of uncertain magnitude. (41, p. 19)

Letson (1958) found the relationship between speed and comprehension to be high when comprehension was measured as number of right responses, low ehen it was the ratio of

rights to number attempted, high for easy material, and lower for harder material. Intelligence also affects the relation between speed of reading and comprehension. At the upper level of intelligence, rapid readers tend to be more efficient, but at the middle and lower levels the slow readers tend to comprehend better. Speed of reading which is "so much a function of vocabulary and comprehension," may also be influenced by such factors as "rate of concept formation" ability to recognize ideas and general word knowledge. (42, p. 239)

Comprehension Score as a Measure of Power of Comprehension

A review of the literature on the measurement of reading rate and reading comprehension reveals that most studies are concerned with the degree of relationship between the two most important factors through the process of reading. In the January, 1959, issue of Elementary English, Drs. Kenneth Husbands and Shores reported an investigation concerned with the relationship between reading speed and comprehension. The general conclusion of this study was that "there is no relationship between reading speed and comprehension when the task is difficult." (43, p. 27) The fast reader was not the best when he was reading biology. Material in order to solve the problem, in fact, under these conditions the efficient and able reader slowed his rate to that of the inefficient reader.

From Shores findings there is some variance to the often stated generality that "the fast reader is the good reader." Dr. Shores did a much more intensive study ten years later also at the six-grade level with better instrumentation and with a comparison group of the able adult readers to see whether it was possible for both of these generalizations to be true. Actually, they are both true, when speed and comprehension are measured as they are in tests of general reading ability. There are good strong positive correlations between reading speed and comprehension. However, when the task becomes difficult either because of more difficult material or a more demanding purpose, or both of these, the relationship between speed and comprehension drops to one that could easily be explained by chance factor. (44, p. 28)

Ward in measuring comprehension in reading, how shall we measure comprehension in reading? He said:

> One solution to the problem can be found in the use of a functional approach based upon the assumption that both skill and knowledge are basic, measurable aspects of comprehension. If the chief purpose of training in reading is to enable students to learn more per minute of time, then speed, flexibility, and knowledge of words and ideas should all be considered fundamental. (45, p. 481)

The best evidence for the validity of the approach he used in his study, however, is the correlations obtained between the four measures (speed, flexibility, selection comprehension, vocabulary comprehension) as outside criterion. The criteria used were the alternate forms of a conventional 25--item multiple choice test over the context of two comparatively difficult essays, Toynbee's "Men Must Choose" and

"Russia and the West." For two classes totaling 37 students, given both forms of both tests during the same week, correlations were as follows:

	Speed	Flex.	Selec.	Vocab.
Form A	.72	.31	.58	.70
Form B	.66	.60	.66	.70

All these correlations, with exception of form A flexibility, are significant at one percent level of confidence. But to conclude, on both theoretical and statistical grounds, the contention was made that all four scores presented genuine measures of comprehension.

Seashore, Stockford and Swartz in a correlational analysis of factors in speed of reading tests at the college level defined speed of reading as "the rate at which a person is able to recognize visually material of a moderate level of difficulty under conditions of direction and illustration which call for a very moderate emphasis upon comprehension." All papers which fell below a certain standard of accuracy were eliminated. Further, power was stressed as the predominant aspect of comprehension. The spread factor in comprehension was eliminated by allowing sufficient time for everyone to read all the selection at least once at his normal rate and to spend the rest of the time in reviewing or checking the most difficult parts of the materials. They found: (1) that the manner of questioning in a speed of reading test, was of less importance in determining an individual's standing in a group than was continuity of context; (2) that the relationship between speed of reading and power of comprehension as

measured by these intelligence tests, Binet Vocabulary and Thurstone Entrance Test, was not significant; (3) that the relationship between power of comprehension and speed of reading on more difficult material with ample time was more marked; (4) that the accuracy score on a test of visual recognition was very slightly but positively related to the time score on the same test, which indicated that speed of reading may vary independently of comprehension under the conditions of the experiment; and (5) that speed of visual recognition was slightly but positively correlated with a difficult reading material of comprehension test in which ample time was allowed for complete reading and in which extensive questions were used to check on the comprehension without possibility of referral to the text (46, p. 187).

Speed and Comprehension Scores Derived from the Same Test with Elimination of the Speed Factor from the Comprehension Score

It is worth knowing what the relationship between rate of reading and learning is. Educationally, this is a vital problem. We cannot assess the extent of the slow reader's handicap, nor the fast reader's advantage in getting an education in the absence of information on this point. The obtained relationship between rate and comprehension scores on standardized reading tests has been construed as supplying this information,

> There are important interrelationships between speed and comprehension in reading. On the one hand, improved comprehension facilitates growth in speed. On the other hand, habits of more rapid reading often aid comprehension by shifting attention from individual

> words to the larger word-patterns that carry the meaning. (47, p. 171)

Therefore, this approach seems to be a very natural approach to study the problem relationship of speed and comprehension. It is more analogous to the school situation where the reading and study is later followed by a check or checks on the comprehension of the material read, but this approach is not unique nor is it new. Stroud administered two printed selections taken from the reading section of one of the Iowa Every Pupil Tests of Basic Skills. Two hundred eighty-eight students, grades V to VIII, served as subjects in this experiment. The students were instructed to read the material "carefully but fairly fast." "Read well and carefully, but do not reread or loaf along. Do not read the article more than once." There were no time limits and no referral was possible from the comprehension questions to the selection after the reading had been completed. The correlation coefficients obtained between rate of reading and comprehension for the four grades, in order from the fifth to the eighth, are: .06, .02, .12, .12, and .02.

In the other experiment Stroud used the same procedure and materials on six hundred twenty-five fifth grade pupils. The text material consisted of four selections of about twelve hundred words each, two of which were taken from widely used fifth-grade social science books and one each from second and ninth grade books in the same field. The students were given no intimation that a test was to follow

the reading of the first selection, one of the fifth grade selections. The correlations obtained between reading time and the learning scores, for the four selections, are as follows: +.03, -.02, -.05, and +.05. These results, as well as those of the two foregoing experiements, give no support to the claim that pupils who read at a rapid rate learn more per reading than those who read at a slow rate. (48, pp. 193-205)

Daniel Heftel in 1960 gave an eight-week, sixteen session reading improvement course. A total of forty-two students were enrolled in the reading groups. This report covers the progress made by twenty-four students who worked primarily on increasing speed of reading and who attended at least half of the sessions. These students initially averaged 251 words per minute on narrative reading, and 229 words per minute with 76% comprehension. On a final measure of rates these twenty-four students averaged 750 w.p.m. on narrative reading and 502 w.p.m. on study reading with 86% comprehension. That is, they approximately tripled their rates of reading narrative material, they more than doubled their rate of reading study material and at the same time increased their comprehension. (49, p. 211)

Here we can decide the expectation that reading comprehension and reading speed co-exist in a one-to-one relationship. Therefore, any investigator when he is studying the relationship between speed and comprehension account the fact that there is unanimous agreement that the

single-coin concept of reading speed and reading comprehension is scientifically unsupportable. Therefore, we are dealing with two independent coins. Hence, there are important interrelationships between speed and comprehension in reading.

Flanagan reported the results of an experiment which has implications as to the importance of measuring comprehension freed from the influence of the time factor. He trained twelfth grade pupils to read passages and answer questions on them at three different rates of speed. Comprehension decreased slightly from the slow to the medium rate and much more from the medium to the rapid rate. When the group was divided into thirds on the basis of their scores at the slow rate, however, each group showed about the same decrease from medium to rapid rates. Rather difficult literary materials were used for the purpose of the experiment. The author concluded that tests efficiency, if the subjects read at their normal rates. The correlation coefficient between speed and comprehension was r of -.07. It is likely that Judd's data would yield a similar negative correlation factor if treated in the same way. The author concluded that there was little difference between slow and fast readers in reading efficiency if the subjects read at the natural or normal rates. (50, pp. 17-21)

Traxler administered five forms of a rate test of twelve hundred words to eighty seventh grade pupils of the University of Chicago High School. The pupils were told

that they were to be examined on the selections read, but they finished the entire story before being tested on it. The comprehension of the story was measured by the multiple choice questions. The pupils were given as much time as they needed to read the story and answer the comprehension questions. Comprehension was thus freed from the influence of time. The scores on the rate of reading each of the forms of the test were correlated with the scores on the comprehension questions based on the same material. The obtained coefficients of correlation ranged from .08 to .21. The results suggest that slow readers understood the test material about as well as did the rapid readers. The findings were verified by measuring the rate and comprehension of ninety-two pupils in the junior class of the University of Chicago High School. Three types of historical material were used, namely, descriptive, narrative, and expository. The time on the entire selection was used as a measure of speed and comprehension was measured by an objective test. The author concluded that when high pupils read with the knowledge that they would be questioned the slow and rapid readers answered the questions about equally well. The rapid readers gave some indication of better comprehension, but the amount of either advantages was negligible. (51, p. 97)

Apropos of measuring the relationship between speed of reading and accuracy of comprehension, Dr. Carver (1972) said, "Evidence is given that reading speed, if measured in

a fine-grained unit such as letters per second, does not increase as passages become more difficult, but is constant across a range that extends from first-grade texts to technical prose." (52, pp. 219-226) He mentioned two other points. First, he is to be commended for criticizing the word as a unit in measuring reading speed. We will show that future research on reading speed should be conducted in letters per second and that many conclusions of previous research must be dismissed as artifacts of an inadequate measure.

A second conclusion offered by Carver as a reliable picture of the relation between letters read per second and difficulty, "Notice that each group had roughly equal rates for the first three paragraphs with a considerable drop in rate for the most difficult paragraphs. The roughly parallel nature of the functions for these two experimental groups suggests that the nature of this function is reliable." (53, p. 49)

Sticht (1971) repeated Carver's experiment using a larger language population, all thirty-six passages. He measured speed of oral reading in syllables per second and he did not find any point where reading speed declined. (54, p. 71)

Carver's 1972 experiment measured reading speed on a scale of difficulty that extended from first-grade material to very difficult technical prose. Each of 83 subjects read a different nine passage scale of difficulty.

Speed was measured in letters per second. The materials were scaled by Miller and Coleman scale. Eighty-three scales were constructed in this manner, providing a different scale of difficulty for each student. The measurement of reading speed is plotted in word per second and also in syllables per second and in morphemes per second. Note, that although the number of words read per second declines as passages become more difficult, the number of syllables and morphemes is constant across the entire range of difficulty. The correlation of three variables with Cloze Score is .90, .90, and .88. (55, p. 48-56)

Kershner (1964) has studied the speed of reading in adults under different conditions. Four hundred and twenty adults read two pairs of passages and unknown to them each reading time was recorded. After reading the first pair of passages, readers were asked to answer a comprehension question. Irrespective of the difficulty level of the passages, reading times for the pair of passages following the comprehension question were significantly longer than for that preceding it. Substantial positive correlations were found between first and second pair reading times for both individuals and for passages. Slow readers showed greater increases in reading time for more difficult materials than did fast readers. Evidence of all dubious value of words per minute as a measure of reading speed is presented. (56, p. 25)

Furthermore, the speed cult is quick to point out that slow readers are rarely careful ones. Speed reading, it would appear, is all profit and no loss and if it can make good its claims at linking efficiency and comprehension, then it is well that its methodology and objectives are incorporated into any reading program. Comprehension is considered to be the major objective in reading rather than the ability to pronounce written words and fluency. However, determination of a pupil's reading comprehension is a complex process as the peak of relationship between these two factors comprehension and speed of reading.

Dr. Hellebust asked this question, "Should reading speed be developed at the elementary level?" The answer to this question is obvious. Yes! Reading speed with comprehension can be developed easily and inexpensively using only the materials available in any class. (57, p. 897) She said the "average" reading rate, expressed in words read in one minute, varies with each grade level. Suggested "average" reading rates for literature type materials are:

Grade 8 -- 255 w.p.m.
Grade 7 -- 225 w.p.m.
Grade 6 -- 210 w.p.m.
Grade 5 -- 170 w.p.m.

In lower grades, where applicability is more limited, suggested "average" rates for stories are:

Grade 4 -- 155 w.p.m.
Grade 3 -- 135 w.p.m.

Finally, the fourth approach to the study of the relationship of speed of reading and comprehension seems to yield consistently low and even negative correlation coefficients.

Summary of Related Literature

There seems to be disagreement on the following:

1. The relationship of speed to accuracy of comprehension.

2. The terminology associated with speed and comprehension.

3. The methods of measuring speed and comprehension.

There seems to be general agreement among authorities on the following:

1. Correlations between speed and comprehension to be reliable should be based on the same or similar material.

2. The degree of relationship between speed and comprehension varies with the methods used in measuring these two factors.

3. The relationship between reading speed and comprehension is small when these two factors are measured independently with the comprehension being untimed.

4. The fastest readers are not necessarily the best readers.

5. Time taken for answering questions should not be included in rate of reading scores.

6. Continuous text is preferred to short passages for measuring rate of reading scores.

The Appropriate Rates to the Nature of Material, Purposes, and Difficulty

As defined in the first chapter, speed is "the number of words read per minute in accomplishing a given purpose." And comprehension was defined as "the accuracy of understanding what is read." Thus, "reading" without comprehension is not reading and is futile. According to this information, one must measure the rate with which material is comprehended. At the same time we must also bear in mind that comprehension itself is always to be considered in relation to the purpose for which the reading is done. Therefore, in practice, it becomes very important to know the rate at which a particular pupil grasps the general ideas in a story, or the rate at which he comprehends an exposition of history or science material. And, in the test situation, rate of reading is rate of comprehending as measured in the particular test. "There is no such general speed of reading ability." (58, p. 375)

A fast rate of comprehension is possible because the pupil possesses the abilities necessary for clear and rapid understanding. Reading should be at as fast a rate as the material can be comprehended properly. Even though a

proper rate of reading mathematical materials is relatively slow, still some pupils read such materials at an undesirably slow rate.

Whatever the material and purpose, there can be a necessary slow rate of progress or an appropriate fast rate. A rapid rate of reading in itself has no particular value or meaning.

> The proficient reader will have several speeds (rate), each, of which can be used as the situation demands. The emphasis should be upon developing as many pupils as possible into adaptable, versatile readers who are able to adjust their rates to the nature and difficulty of the material and to the purpose for which the reading is done. (59, p. 374)

"The problem of the relationship between the two factors is complicated by the fact that an efficient reader will vary his rate of comprehension according to the type and difficulty of the material." (60, p. 374)

In the school situation, if we educate the children to read effectively, rate must be appropriate to the nature and the difficulty of the material because of the nature of materials varies widely.

Adjusting to variations is somewhat similar. Variation in difficulty arises in many approaches. Materials in some content areas are more difficult than in others, for example, science or mathematics as compared with literature. Easy material should be read faster than difficult material. And familiar material should be read faster than unfamiliar material.

> Perhaps most important of all adjustment of rate of reading to the purpose for which the reading is done. If the pupil needs to get only a general idea

> or impression, or if he merely needs to look up a given item on a page, the speed should be relatively high. But if he needs to grasp the concepts in a given selection thoroughly, his pace will be relatively slow. This emphasizes the importance of reading. (61, p. 131)

However, as noted by Carlson, rapid readers are more efficient in comprehension at the upper levels of intelligence, and slow readers more efficient at lower levels of intelligence. Factors which affect the size of the correlation between speed and comprehension include the nature of the reading tasks, techniques of measurement, difficulty of the material, and purpose for which the reading is done. (62, p. 376)

There is no one rate of reading that is appropriate in all situations, rather, the efficient reader varies his rate of reading according to his purposes and the requirements of the material. While the degree of relationship between rate and comprehension varies with the age of the readers, the kinds of material used, the chronological age, and the methods used in measuring the two factors. Strictly speaking, the comprehension is the heart of reading. "It is known that comprehension depends upon several simpler aspects of the complex and interrelated reading process." (63, p. 12) Here again, speed and comprehension go hand-in-hand, and the same face to the one coin.

Chapter III

SUMMARY, CONCLUSIONS, AND RECOMMENDATION

Summary

The purpose of this study was to describe the relationship between speed of reading and accuracy of comprehension. Hence, in teaching reading the teacher must consider different purposes, difficulty of material and the type of reading material.

The results reported in the literature on studies of speed of reading are often seemingly in conflict. However, as mentioned in Chapter II many of the apparent discrepancies are resolved and there is a degree of unanimity among the findings if the studies are critically read and evaluated as to method of measuring speed and comprehension. Studies using similar methods of measurement tended to secure or obtain similar results.

A study by Seashore, and others, previously reported in Chapter II indicated a source for discrepancies among results on studies of speed of reading. They found the manner of questioning in a speed of reading test to be of less importance in determining an individuals standing in a group than was continuity of context within the tests. The implication is clear. Studies of speed of reading whose tests are characterized by continuous context cannot be

compared with studies of speed of reading employing tests which consist of several or many discrete and different selections. It would seem to be incumbent upon the research worker investigating any aspect of speed of reading to clearly define and explain the tests used in arriving at the measure of speed of reading.

Rate is only meaningful as it defines the rapidity with which the reader covers material at a particular level of comprehension. A student adapts his reading to the demands of the particular material, to move as rapidly or as slowly as the requirements of the material and his own purposes in reading dictate. The question of the relation of speed and comprehension is a perplexing one, to which the experimental data give no single clear-cut answer. Since speed without comprehension is worthless, it is believed the greater emphasis should always be placed upon comprehension in the reading process. After his study of one hundred high school freshmen to discover the relationship of reading to comprehension, Tinker stated that, the relation between rate of work and power of comprehension is determined in some degree by the level of difficulty of the reading material. In relatively easy reading, this relation is fairly high, but in more difficult material the relation is still significant but relatively low to moderate in size.

Carlson found that the effectiveness of fast and slow readers is dependent upon their level of intelligence, their purpose, the difficulty of materials, and the continuity of context. He found that bright, rapid readers are more

efficient than slow ones and that average and slow readers comprehend more when they read slowly. Fast readers are not always good readers, nor are slow readers necessarily poor readers.

Here again, the relationships between speed of reading and comprehension are not firmly established. Various studies (Carlson, Eurich) have reported correlations ranging from slightly negative to highly positive, with many of them insignificantly small. The basic reason for the differences in these correlations and for the generally low relationships discovered lies in individual differences among pupils in responding to any one various reading situation. Conversly, one perplexing yet common problem facing the teacher is the student who responds to reading assignments by stating, "I read it, but I don't understand it." What is the most effective method of teaching speed and comprehension at the elementary school level?

Conclusions

Based on the literature reviewed in this study the following conclusions are drawn:

1. The relationship between speed of reading and accuracy of comprehension are influenced by the purposes for reading, the degree of difficulty of the materials, and the type of the reading materials. Therefore, the exact relationship between speed of reading and comprehension are not firmly established.

2. It is suggested that no general statement can be made about the relationship between speed and accuracy comprehension, other than that it varies with the condtions of reading of imposed and with the method of measurement.

3. Research indicates that there is a direct relationship between comprehension and the speed of reading. Hence, it has assumed that reading comprehension and reading speed are interrelated.

4. The evidence indicates that speed of reading is not a unitary concept that can be adequately coped with in group situations with some pacing device. It is rather a complicated and involved problem that must be resolved for each individual case with due consideration to the following factors: purpose, for reading, difficulty of materials, and types of materials.

5. Research will undoubtedly reveal other factors influencing the relationship between speed of reading and accuracy of comprehension which should be considered in any program of developmental or remedial instruction and the attendant appraisal problem

Recommendations

In this study general recommendations did take place by using different methods in teaching reading in the elementary school:

1. It is important for the teacher of reading to give careful attention to comprehension in any attempt to increase the reading speed of individuals.

2. Any program of instruction in reading emphasizing speed per se is apt to be disastrous to the accuracy of comprehension of the less able individuals.

3. The teacher needs to determine at what speed the individual's comprehension begins to deteriorate.

4. Every teacher should keep in mind that rapid reading is itself or per se is not a cause of better understanding. A fast rate of comprehension becomes possible only because the pupil possesses the abilities necessary for clear and rapid understanding.

5. One perplexing yet common problem facing the teacher is the student who responds to reading assignments by stating, "I read it, but I don't understand it." This is the educator's duty now and in the future to study the following question, what is the most effective method and measurement instrument of teaching and measuring the two factors speed and comprehension at the elementary, secondary, and college levels?

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THE RELATIONSHIP BETWEEN SPEED AND ACCURACY OF COMPREHENSION IN TEACHING READING

by

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The purpose of this study was to describe the relationship between speed and accuracy of comprehension in teaching reading.

The better way to describe the relationship between speed and comprehension to be described and studied, was to ask these questions:

1. What is the relationship of speed reading to accuracy of comprehension when reading for different purposes?

2. What is the relationship of speed reading to accuracy of comprehension when reading material at varying levels of difficulty?

Definition Terms Used:

Speed: Speed of reading refers to the number of words read per minute that can be read in a given period of time in accomplishing a given purpose.

Comprehension: Comprehension was considered as the accuracy of response to test items calling for understanding.

A cursory review of the literature seems to present a welter of confusion about the problem of the relationship between speed and comprehension in reading. But research and thought in education still seek a better understanding of the nature of the reading process.

Different approaches used by investigators are:

1. Speed and comprehension scores derived from separate tests.

2. Speed and comprehension scores are measured on identical reading test.

3. Comprehension score is a measure of power of comprehension.

4. Speed and comprehension scores derived from the same test with elimination of the speed factor from the comprehension.

In conclusion, the review of the research which was made, particularly in this area, indicates that the relation between speed of reading and comprehension varies with approach used in the experiment. It is significant for this study to note that when the speed factor is removed from the measurement of comprehension the relationships found have been mostly of a chance role.

There seems to be disagreement on the following:

1. The relationship of speed and comprehension.

2. The terminology associated with speed and comprehension.

3. The methods of measuring speed and comprehension.

There seems to be general agreement among authorities on the following:

1. Correlations between speed and comprehension to be reliable should be based on the same or similar material.

2. The degree of relationship between speed and comprehension varies with the methods used in measuring these two factors.

3. The relation between reading speed and comprehension is small when these two factors are measured independently with the comprehension being untimed.

4. The fastest readers are not necessarily the best readers.

5. Time taken for answering questions should not be included in rate of reading scores.

6. Continuous text is preferred to short passages for measuring rate of reading scores.