

THE IMPORTANCE OF READING RATE

THESIS

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Chapter 1

STATEMENT OF THE PROBLEM

Purpose of the Study

The purpose of this study was to investigate the importance of rate of reading in achieving comprehension. The investigation involved thirty-two subjects of average intelligence or above in the fourth and fifth grades who were classified as poor readers.

Significance of the Study

Tests such as the Durrell Analysis of Reading Difficulty rely on rate in determining instructional levels for children. Is this a valid measure? How important is speed? Most test instruments use two ways of measuring comprehension--recall and questions. What are the differential effects of relying on recall only as compared with a combination of recall and questions?

Frank Smith (1971) holds that the very nature of the reading process forces the reader to be fast and selective. With the help of his past experience the reader must choose units of meaning from the printed page and develop a speed that will allow him to keep ahead of losses in sensory store and in short-term memory. Smith defines fluent reading as relatively fast reading which he sees as being around 200 words per minute. He suggests that:

When a child is having difficulty, plodding laboriously over words in an attempt to read a passage, it may well be advantageous for him to speed up in an endeavor to grasp more of the sense of the passage, reduce uncertainty, and increase his span of apprehension. (p. 103)

According to David Elkind (1974) rapid reading and comprehension involve independence from the sensory system. Wide visual scanning and fewer motor fixations mean less motor involvement and more use of inference on the part of the developing reader. Elkind states that many slow readers "have problems with receptive discipline and not with rapid reading" (p. 19). Being more concerned with his own thoughts and ideas interferes with the child's interpretation of the thoughts and ideas that he is meeting on the printed page. Two prerequisites to rapid reading and comprehension are visual scanning and receptive interpretation of the ideas of others--important steps in a child's cognitive development as seen by Elkind.

Albert Harris (1970) says that the average reader wastes time reading too slowly and that speed could be boosted from 25 to 50 percent with retention of comprehension. The relationship between reading rate and comprehension varies with the age of the reader, the material being read, and the methods used in measurement. In primary-grade children slow rate is caused by word-recognition difficulties which also affect comprehension. In the upper grade levels research shows varying causes of poor reading rate. Harris sees three patterns in children having problems in speed and comprehension. A child may be:

1. poor in comprehension and a slow reader,

2. poor in comprehension and a fast reader,
3. good in comprehension and a slow reader.

According to Harris reading rate increases from grades 2 through 9, and 250 words per minute is a rough estimate of the normal rate of reading for high-school students and adults. Harris's "Table of Median Rates" lists 155 words per minute as the median rate for fourth graders and 177 words per minute for fifth graders (p. 485).

The section of the manual of the Stanford Diagnostic Reading Test, Level II, relating to the Rate of Reading subtest states that reading speed reflects the habit of the reader and his efficiency in decoding (Karlson, Madden, and Gardner, 1966). Children scoring low on this test fall into three categories:

1. the inefficient reader who is slow because of word-recognition difficulties,
2. the superficial reader who reads fast but has low comprehension,
3. the slow reader who reads slowly out of habit.

Walter Hill (1968) found that as with other aspects of the reading process, reading rate and reading-rate improvement are influenced by: personal characteristics, intelligence, general language knowledge, conceptual background, basic reading skill, physical condition, psychological drive, and emotions. He contends that silent reading is more efficient than oral reading as soon as a child has mastered the fundamentals of reading and has built a basic sight vocabulary.

Definition of Terms

Poor readers--children of average or above intelligence with reading expectancy quotients below 90 where normal limits are between 90 and 110 according to Harris (p. 212)

Intelligence--based on the Peabody auditing quotient using a base of 90 as the lower limit for average intelligence

Reading rate--based on transposal of Durrell's Low, Medium, and High timed levels to equivalent grade levels

Memories--material recalled without prompting

Prompted questions--material elicited with the aid of questions

Limitations

This study was limited to 32 poor readers of average or better intellectual ability. They were in grades 4 and 5 and were enrolled in a remedial-reading program in a single school.

Summary

The oral and silent reading of poor readers in the fourth and fifth grades was examined in this study. It investigated the importance of speed in reading and the resultant comprehension. Oral and silent reading rates were compared. The ways children communicate their understanding of the materials they have read were examined. Did they show their comprehension better by recall or by response to questions? One group's performance over a three-year period was analyzed regarding their reliance on memories or questions in comprehension.

Chapter 2

REVIEW OF THE LITERATURE

Historical Trends

Speed of reading appears to be one of the most widely discussed aspects of the reading process. The interest became apparent in the 1930's when Miles Tinker (1932) concluded that if rate and comprehension were measured on similar materials, there was a close relationship between speed and comprehension in reading. Through the decade Tinker continued to study the importance of speed in reading in relation to typographical factors (Berger, 1966). Also in the 30's Francis A. Robinson began a series of studies relating to rate. He and Tinker had opposing views and tangled in print over the relationship between rate and comprehension. Robinson (1940) felt that most of the experimental evidence was in error because the tests used in the research measured only themselves.

At the end of this era, there appeared to be agreement that rate and comprehension of easy material were related. However, as the material became more difficult, the relationship seemed to become less direct. Stroud and Henderson (1943) in a series of experiments found no relationship between rate and comprehension. They contended that the brighter person who might normally be a fast reader might, as he

pondered over what he was reading, occasionally slow his speed. They concluded that the relationship between speed and comprehension varied with the conditions of reading and the method used in measuring the resulting speed and comprehension.

Another question investigated during the 30's was, who read faster, boys or girls? In general, girls were found to be the faster readers. Berman and Bird (1933) found that among 463 women and 327 men participating in a college sophomore psychology class, the women read 20 words per minute faster than the men.

With the 1940's the focus shifted to studies relating to perception in reading. Thus began the era of the use of machines to improve reading rate--the tachistoscope, the controlled reader, the reading-rate controller. The investigations showed that rate was improved by the use of machine techniques but also that there were easier and less expensive ways to bring about this improvement. In a review of the literature, Karlin (1958) found that in 11 out of 12 studies on machines versus nonmachines equal or better results were obtained using no machines. As a result of his investigation, he suggested that it might be better to spend more money on materials to be read rather than on machines. Berger (1966) studied the effectiveness of four different methods of increasing rate, comprehension, and flexibility by using a tachistoscope, a controlled reader, controlled pacing, and paperback scanning. He found that while each method increased reading rate, the comprehension level remained the same, and

that the paperback-scanning method was the most effective way to increase reading rate.

The next area to be observed and reported on was that of college and adult reading programs with attention to speed and comprehension. Most of these studies involved machines and reading-rate improvement. One work reported by Cosper and Kephart (1955) showed that 14 months after speed-reading training, the subjects maintained a 60-percent gain in speed.

The 1960's and 1970's saw a revived interest in studies of perception and the processing of visual information. Taylor (1957) reported that the average reader cannot see several words or several phrases with a single fixation of the eye. Thomas (1968) stated that the predominant eye movement in reading is the saccade. When looking at a line of print, three or four words can be seen distinctly and in reading all of the words on a line, the eye has to jump two or three times. How often the eye jumps depends on the reader's ability to process visual information as well as on his interest in the material he is reading. As the material gets more difficult, fixation times get longer. With more difficult material the eye may regress as the reader needs more time to process the incoming information. This slows the reader's speed. Conversely, the reader's rate may become faster as he uses his knowledge of his language to anticipate words or sequences of words and thus fixate on only the first few words in a phrase.

Frank Smith (1971) holds that:

The reader has to be fast--the information he gets from the page is not available to him continuously, but is delivered "in packages" about four times a second to a sensory store, the visual image, where it stays for not much more than half a second.
(p. 94)

Selectivity on the part of the reader is imperative because no matter how much information enters the visual system, he can only process four or five items into short-term memory. So, in addition to being fast, he must choose the few items that will give him the best information for his purposes. The fluent reader knows so much about his language that he does not need so much information from the page. The number of fixations he makes will vary with his skill or with the difficulty of the material. According to Smith the fixation rate settles down by about the fourth grade and the child who doesn't make regressions is probably reading too slowly while the one who makes too many is having difficulty. He further states:

There is no one best reading rate; that depends on the difficulty of the passage and the skill of the reader. The optimal rate also depends on the reading task itself--on whether the reader is trying to identify every word, for example, in order to read aloud, or whether he is "reading for meaning" only.
(p. 103)

Thus, the reader has to be fast and selective and be able to use prior knowledge in order to process the visual information available to him.

Also of interest in this period was the topic of flexibility of speed and reading for different purposes. Albert Harris (1970) said,

There is no one rate of reading that is appropriate in all situations, the efficient reader varies his rate according to his purposes and the requirements of the material. (p. 481)

Four different rates for four purposes were listed by Gerald Yoakam (1955). They were: skimming, rapid reading, normal rate, and careful rate. Rauch and Weinstein (1968) also listed four rates needed in reading:

1. skimming--locating main ideas and details,
2. rapid reading--fast rate while reading every word,
3. intensive reading--slow rate with careful reading and rereading,
4. recreational reading--using all rates for pleasure and information gaining.

McConkie, Rayner, and Wilson (1973) stated that the ability to

be flexible is a characteristic of the better, more mature reader.

They did find, however, that in general even good readers were quite inflexible in their rate and that all readers varied their speed according to the type of test they anticipated. McConkie et al. held that the speed of reading was influenced by the payoff the reader expected--the type of questions, the number of questions, the method of answering, and that people adjust both their speed and the type of information they retain from passages according to the conditions under which they are reading.

Much research has been done concerning rate of reading. The effectiveness of tachistoscopic and controlled-pacing devices in improving

rate of reading has been studied in depth but relatively little research has been done on the use of paperback scanning in improving rate. Reading flexibility and retention of gains in rate and comprehension after a reading-improvement program are also areas in need of more investigation.

Discussion of Rate of Reading

Research shows that reading rates are influenced by many different factors: physiological, psychological, and intellectual. The reader's background of experience, the difficulty of the selection, the type and difficulty of the questions used to check comprehension, and the reader's purpose--all influence the rate at which he will read a selection. Gerald Glass (1967) listed the following ingredients in efficient reading: vocabulary, academic achievement, compulsiveness, drive, rate of perception, closure, and flexibility of closure. He found that not having to ponder over word meanings helped to increase the speed of reading. He also found that orderliness might cause the reader to consider each word too carefully with a resulting loss of speed. Striving for goal attainment as quickly as possible could also be an important factor in attaining a fast reading rate. Glass concluded that there was little evidence to support the premise that those with lower grades were the slower readers.

Letson (1958) felt that effective reading depended on level of intelligence, purpose for reading, level of difficulty of the material

to be read, opportunity for referral in answering questions, and continuity of context. He found that the difficulty of the material had a greater effect on speed than did the purpose for reading.

Buswell (1951) found a correlation between reading rate and rate of thinking. In 1934 Traxler had said that there was evidence that the slow rate of some readers might be because of their slow association rate (Weintraub and Hanson, 1968). Harris (1970) felt that "to some extent, rate of reading is related to rate of thinking. It does no good to try to read faster than one can assimilate ideas" (p. 487).

Jules Abrams (1963) noted that slow reading speed might be due to lack of attention and that attention span suffers from blows of anxiety. When attention span is eaten up by anxiety, the individual's ability to understand written material is severely impaired. And when attention and concentration are both depressed, the resultant emotional factors often make it impossible to read with speed and comprehension.

Reading speed reflects habit and efficiency of decoding according to the Manual of the Stanford Diagnostic Reading Test (Karlson, Madden, and Gardner, 1966). J. Harlan Shores (1968) saw fast readers as the ones that generally do well on the reading tasks presented in the standardized reading tests, and he felt that there were strong, positive correlations between reading speed and comprehension.

The picture of the slow reader is one who rarely reads, who thinks that he should remember all of the main ideas and all of the

details in what he does read. He believes that he should read every word and thinks that he should read slowly in order to accomplish the above (Maxwell and Mueller, 1967). The vicious circle continues for the poor reader as:

Research shows that the poor reader may spend 10 to 15 times as long reading an assignment as an able reader. The poor reader may justifiably become frustrated and discouraged if he is expected to read as much as the able reader (Harris, 1973, p. 218).

It has also been found that

. . . most children with reading problems perform tasks slower than most other children, which suggests that stimuli routing, information processing, thought processing, and decision making are also slower than "normal." (Buktenica, 1975, p. 20)

If speed is an important factor in successful reading, when should instruction along these lines be started? Judd and Buswell (1922) found that speed and span of perception seem to develop during the elementary-school years. Eye-movement data show that the period of greatest development in span of recognition, speed of recognition, and regularity of eye movements comes during the period between first and fourth grades. Singer (1965) also has shown that the greatest working system for attaining speed of reading undergoes a developmental shift from a predominance of visual-perception abilities at third-grade level to a more evenly divided split between visual-perceptual and word-meaning factors at the sixth-grade level. He suggested that children in primary grades might not have matured enough in visual perception or in verbal development to benefit from formal training in faster reading.

Many factors influence the rate of reading, and the importance of speed is still a question in the minds of researchers. Most tend to agree that a speed of between 200 and 250 words per minute is essential for adequate comprehension. Agreement also appears unanimous on the need for flexibility of rate in reading for different purposes.

Durrell Analysis of Reading Difficulty

The norms for the oral and silent reading subtests on the Durrell Analysis of Reading Difficulty are based on the time required for reading the paragraphs (Durrell, 1955). According to the test manual, these norms were standardized on "no fewer than a thousand children for each test" (p. 32).

Miles Tinker was quick in his criticism of the first edition of the Durrell test stating that it was "contrary to good practice to use rate of reading to determine reading grade when comprehension is being measured" (1941, p. 1534). In agreement with this view was Helen Robinson (1953) who found the scoring method inconsistent with the stated purpose of the test. She further criticized the lack of description of the population used for standardization of the norms and the lack of mention of reliability or validity of the test in the manual.

When the revised edition of the Durrell appeared, Spache (1959) took issue with the grade levels assigned to the various paragraphs in addition to objecting to there being only a single paragraph at each level. James Maxwell (1959), too, questioned Durrell's use of norms based on speed of reading rather than on comprehension of the

material.

There appears to be agreement on two major criticisms of the Durrell Analysis of Reading Difficulty concerning the use of rate exclusively for determining grade level and the lack of information on the establishment and validity of those norms.

Chapter 3

DESIGN OF STUDY

Purpose

The rate of reading of thirty-two subjects was investigated in relation to achieved comprehension by analyzing both oral and silent reading scores. Analysis was made of oral and silent reading speeds along with an investigation of methods of measuring comprehension. Scores for a three-year period were studied to determine whether recall or questions were better vehicles for eliciting understanding of material read.

Hypotheses

The following hypotheses were tested:

1. There is no difference between estimated reading levels of poor readers when the estimation is based on rate of reading only or on demonstrated achievement in comprehension using the Stanford Achievement Test, reading comprehension subtest.
2. There is no difference between poor readers' silent and oral reading rates at grade-levels 4 and 5.
3. There is no difference between demonstrated achievement in comprehension using the Durrell silent reading subtest in poor readers as determined by recall alone and that prompted by examiner's questions.
4. There is no difference between the amount of material recalled freely and that prompted by questions as poor readers mature over a three-year span.

Methodology

Subjects. Involved in this study were thirty-two children divided by grade level as follows: fourteen, currently in the fourth grade; nine, currently in the fifth grade; and nine, in the fifth grade a year prior to the investigation for whom three-year records were available. The groups consisted of white, suburban children from varying socio-economic backgrounds with auding quotients ranging from 90 to 139. In the area of reading these children had reading quotients of less than 90 where 90 to 110 is the range of normal. The lower the expectancy quotient, the more severe the disability.

Instruments. The following tests were used:

Durrell Analysis of Reading Difficulty, New Edition
(Oral and Silent Reading Subtests)

Stanford Achievement Test, 1973 Edition
Primary Level III, Form A
(Reading Comprehension Subtest)

Stanford Achievement Test, 1973 Edition
Intermediate Level I, Form A
(Reading Comprehension Subtest)

Peabody Picture Vocabulary Test, 1965 Edition

The Durrell oral and silent reading paragraphs, levels 1 through 4, were examined for readability. The paragraphs were analyzed to obtain grade-level ratings using the Revised Spache Readability Formula (1974), not for use statistically but for subjective evaluation of the test paragraphs. The age of the Durrell test and the revision

of the Spache formula gave credence to this part of the project.

Procedures. The subjects were given the silent reading comprehension subtest of the appropriate form of the Stanford Achievement Test in September of 1974 or 1975. The test, which required the subjects to read paragraphs of increasing difficulty and then select answers to questions from four choices, were administered by their classroom teachers.

In the same September the subjects were given an individual battery of tests including the Oral and Silent Reading subtests of the Durrell Analysis of Reading Difficulty and the Peabody Picture Vocabulary Test.

The Oral Reading subtest of the Durrell Analysis of Reading Difficulty consists of a series of eight paragraphs. It is suggested in the Manual of Directions (1955) that the number of the paragraph indicates the difficulty of the passage in terms of grade level. The child is asked to read a paragraph while the examiner records the time and notes errors (omissions, repetitions, words pronounced for the child, hesitations). The relative importance of these errors must be decided by the examiner in grading the test. A series of questions is then asked relating to the selection. At the top of each paragraph grade norms are provided for use with the child's timed score. For example, if the child read the third paragraph in 50 seconds, his rating would be 2M (middle of second grade). If he read the third paragraph

in 21 seconds, his rating would be 3H (high third grade). He is allowed to progress through the paragraphs until he makes more than six errors in a selection.

Each child was administered the Oral Reading subtest according to the Manual of Directions with time, errors, and comprehension recorded. In addition, an untimed score was determined by allowing the child to continue reading regardless of time until his comprehension level fell below 70 percent.

The Silent Reading subtest of the Durrell Analysis consists of "eight paragraphs, equal in difficulty to the oral reading paragraphs" (Durrell, 1955, p. 3). The norms are similar to those for the Oral Reading subtest according to the Manual of Directions with time, unaided recall, and aided recall recorded. Again, an untimed score was determined by allowing the child to read until his unaided and aided recall total fell below 70 percent.

The Peabody Picture Vocabulary Test was administered to determine the child's auding quotient, an indication of his understanding of language on an auditory level. In this test the subject is shown a set of four pictures and asked to indicate the picture that reminds him of a stimulus word pronounced by the examiner. He proceeds through succeedingly more difficult words until he misses six out of eight words. The auding quotient is then found on a chart by using his total number of correct responses. Standard-score norms for converting raw scores to intelligence quotients are provided in the Manual (1965).

Statistical analysis. A t-test was used to determine the homogeneity of the two fifth-grade groups.

Analyses of variance were used to determine the significance of mean differences among.

1. 4th graders: oral, timed--oral, untimed
5th graders: oral, timed--oral, untimed

4th graders: silent, timed--silent, untimed
5th graders: silent, timed--silent, untimed

4th graders: silent, timed--comprehension
5th graders: silent, timed--comprehension
2. 4th graders: oral, timed--silent, timed
5th graders: oral, timed--silent, timed

4th graders: oral, untimed--silent, untimed
5th graders: oral, untimed--silent, untimed
3. 4th graders: silent, with recall only--with questions
5th graders: silent, with recall only--with questions
4. Increase in recall with scores representing the percentage of gain of memories after prompting over a period of three years

In summary, the study intended to examine the differences among 32 poor readers with respect to rate influence on the determination of reading levels. It also intended to examine two of the ways used to measure comprehension--recall and questioning.

Chapter 4

ANALYSIS OF DATA

Purpose

The purpose of this investigation was to examine the relationship between rate of reading and actual achievement in comprehension. Oral and silent reading rates were compared as were methods of measuring comprehension. Finally, an analysis was made concerning reliance on memories or questions in comprehension over a three-year period.

Findings

The null hypotheses tested were:

1. There is no difference between estimated reading levels of poor readers when the estimation is based on rate of reading only or on demonstrated achievement in comprehension using the Stanford Achievement Test, reading comprehension subtest.
2. There is no difference between poor readers' silent and oral reading rates at grade-levels 4 and 5.
3. There is no difference between demonstrated achievement in comprehension using the Durrell silent reading subtest in poor readers as determined by recall alone and that prompted by examiner's questions.
4. There is no difference between the amount of material recalled freely and that prompted by questions as poor readers mature over a three-year span.

Since the two fifth-grade groups were from classes of two different years, a t-test was used to determine the homogeneity of the two groups. They were found to be similar according to comparisons of timed silent reading and silent reading comprehension.

To test the first hypothesis that there is no difference between estimated reading levels of poor readers when the estimation is based on rate of reading only or on demonstrated achievement in comprehension an analysis of variance was used to compare the results of 4th graders' estimated reading levels on silent-timed paragraphs and silent reading comprehension scores on the Stanford Achievement Test as shown in Table 1a.

Table 1a

Analysis of Variance of 4th Graders: Silent, Timed Score
and Stanford Achievement Comprehension

Source	SS	DF	MS	F
Treatments	1.20	1	1.20	1.78
Error	17.51	26	.67	
Total	18.71	27		

Critical $F(\alpha = .05) = 5.66$

The calculated F-ratio was less than the critical F-ratio of 5.66 and it was concluded that there is no difference between the

estimated reading levels of poor 4th-grade readers using Durrell's silent reading timed limits and the level of reading comprehension as measured by the Stanford Achievement Test.

The results of the analysis of variance used to compare the scores of the 5th graders' estimated reading levels based on silent-timed paragraphs and silent reading comprehension scores appear in Table 1b.

Table 1b

Analysis of Variance of 5th Graders: Silent, Timed Score
and Stanford Achievement Comprehension

Source	SS	DF	MS	F
Treatments	1.78	1	1.78	2.0
Error	30.35	34	.89	
Total	30.37	35		

Critical $F(\alpha = .05) = 5.51$

Again, the calculated F-ratio was less than the critical F-ratio of 5.51, and thus there is no difference between the estimated reading levels of poor 5th-grade readers on Durrell's silent reading timed limits and the Stanford Achievement Test's measured level of reading comprehension.

Mean differences between poor readers' silent and oral reading rates at the 4th-grade level were also tested by means of an analysis of variance. The results of this test are summarized in Table 2a.

Table 2a

Analysis of Variance of 4th Graders: Oral, Timed Score
and Silent, Timed Score

Source	SS	DF	MS	F
Treatments	.24	1	.24	.48
Error	13.05	26	.50	
Total	13.29	27		

Critical $F(\alpha = .05) = 5.66$

The data in Table 2a form the basis for the conclusion that there is no significant difference between oral and silent reading rates of poor readers in the 4th grade since the critical F-ratio of 5.66 was greater than the calculated F-ratio.

The results of the analysis of variance of 5th graders' silent and oral reading rates are summarized in Table 2b.

Table 2b

Analysis of Variance of 5th Graders: Oral, Timed Score
and Silent, Timed Score

Source	SS	DF	MS	F
Treatments	.34	1	.34	
Error	11.97	34		
Total	12.31	35		

Critical $F(\alpha = .05) = 5.51$

The failure to meet the critical F-ratio of 5.51 indicated failure to reject the null hypothesis and there is no significant difference between oral and silent reading rates of poor readers in the 5th grade.

Mean differences of comprehension displayed by spontaneous recall as compared to cued recall on the Durrell Silent Reading paragraphs were tested using an analysis of variance. The results for poor readers in the 4th grade are tabulated in Table 3a.

Table 3a

Analysis of Variance of 4th Graders' Spontaneous Recall
Compared to Cued Recall

Source	SS	DF	MS	F
Treatments	.32	1	.32	.15
Error	54.36	26	2.09	
Total	54.68	27		

Critical $F(\alpha = .05) = 5.66$

Inspection of Table 3a reveals no significant difference between freely recalled material and recall stimulated by questioning because the test did not meet the critical F-ratio of 5.66.

Table 3b shows the results of the comparison between mean differences of poor readers in the 5th grade and the material they recalled freely versus that cued by questions using the Durrell Silent Reading paragraph scores in an analysis of variance.

As can be seen in the following table, the test did not meet the critical F-ratio of 5.51 and the null hypothesis that there is no difference between demonstrated achievement in comprehension in poor readers at the 5th-grade level as determined by recall alone and that prompted by examiner's questions was not accepted.

Table 3b

Analysis of Variance of 5th Graders' Spontaneous Recall
Compared to Cued Recall

Source	SS	DF	MS	F
Treatments	1	1	1.0	.53
Error	64	34	1.88	
Total	65	35		

Critical $F(\alpha = .05) = 5.51$

Examination of the hypothesis that there is no difference between the amount of material recalled freely and that prompted by questions as poor readers mature over a three-year period appears in Table 4a.

By means of an analysis of variance the percentage of memories gain before and after prompting by questions of the three-year span was investigated.

The following table shows that the critical F-ratio of 4.18 was not met indicating that there is no difference between the amount of information gained through either recall or questioning over the three-year span. Poor readers from the 3rd to 5th grades did not gain in total comprehension because of either spontaneous memory or recall evoked through cued questions.

Table 4a

Analysis of Variance of Percentage of Memories Gain before and after Prompting from 3rd Grade through 5th Grade

Source	SS	DF	MS	F
Treatments	318.91	2	159.45	.33
Error	14386.1	30		
Total	14705.0	32		

Critical $F(\alpha = .05) = 4.18$

An important factor came to light as further statistical analyses were done on the three-year group. An analysis of variance was run to see if recall alone could account for the gain in total comprehension over the period. Table 4b relates the results of this analysis.

Table 4b

Analysis of Variance of Memories Gain before Questions, 3rd Grade through 5th Grade

Source	SS	DF	MS	F
Treatments	425.88	2	212.94	8.18*
Error	781.09	30		
Total	1206.97	32		

*Critical $F(\alpha = .05) = 4.18$

There was a significant difference at the .05 level between the means of the percentage of memories gain before questions in 3rd grade, 4th grade, and 5th grade in this study. The calculated F-ratio of 8.18 was higher than the critical F-ratio. The subjects demonstrated that over a three-year period they did indeed remember more on their own.

Further work was done concerning this group and their response to questioning over the span of the investigation. An analysis of variance was done regarding the effect of questioning alone in the gain in total comprehension over the three years. The results of this section of the research are reported in Table 4c.

Table 4c

Analysis of Variance of Memories Gain after Questions,
3rd Grade through 5th Grade

Source	SS	DF	MS	F
Treatments	624.73	2	312.36	10.77*
Error	870.18	30	29.01	
Total	1494.91	32		

*Critical $F(2, 30) = .05) = 4.18$

The critical F-ratio of 4.18 was met indicating that questioning did produce a gain in total comprehension over the three-year span.

The level of significance was .05. The subjects made a gain in what they could remember from their reading as a result of cued questions.

Summary

The results of the null hypotheses tested indicate:

1. Failure to reject the hypothesis that there is no difference between estimated reading levels of poor readers when the estimation is based on demonstrated achievement in comprehension using the Stanford Achievement Test, reading comprehension subtest.
2. Failure to reject the hypothesis that there is no difference between poor readers' silent and oral reading rates at grade levels 4 and 5.
3. Failure to reject the hypothesis that there is no difference between demonstrated achievement in comprehension using the Durrell silent reading subtest in poor readers as determined by recall alone and that prompted by examiner's questions.
4. Failure to reject the hypothesis that there is no difference between the amount of material recalled freely and that prompted by questions as poor readers mature over a three-year span.

Further analyses of variance indicated that over a three-year period:

1. Each year there was an improvement on what was remembered by recall alone which was significant at the .05 level.
2. Each year there was an improvement in the amount recalled with questions which was significant at the .05 level.

Interpretations

The results of the analyses of the data collected indicated that:

1. There is no difference between the timed Durrell silent reading score and a poor-reader's performance on the Stanford Achievement Test subtest on reading comprehension at the 4th- and 5th-grade levels.
2. There is no difference between a poor reader's silent reading and oral reading rates at the 4th- and 5th-grade levels.
3. Questions do not appear to make a difference in helping poor readers increase their comprehension.
4. Poor readers do not depend less on questions over a three-year period.
5. There is a significant increase over three years in what a poor reader is able to recall both with and without questions.

Additional Findings

In addition to the four formal hypotheses that were tested, other statistical information was gathered in relation to the Durrell Analysis of Reading Difficulty, oral and silent reading subtest results. One analysis concerned comparing the timed oral reading score as derived by Durrell's instructions and the untimed score where the reading is terminated only when the level of comprehension falls below 70 percent. Table 5a shows the data obtained from this analysis of variance.

Table 5a

Analysis of Variance of 4th Graders:
Oral, Timed and Oral, Untimed

Source	SS	DF	MS	F
Treatments	1.16	1	1.16	1.38
Error	21.85	26	.84	
Total	23.01	27		

Critical $F(\alpha = .05) = 5.66$

There was no significant difference between the scores obtained on the oral reading subtest of the Durrell Analysis of Reading Difficulty using the recommended timed score as the Manual directs or taking as a score the highest level paragraph that the student was able to read with 70-percent comprehension.

The same comparisons were made at the 5th-grade level using the timed oral reading score and the untimed comprehension score determined by 70-percent comprehension of the highest level paragraph read. These results are tabulated in Table 5b.

Table 5b

Analysis of Variance of 5th Graders:
Oral, Timed and Oral, Untimed

Source	SS	DF	MS	F
Treatments	3.18	1	3.18	3.83
Error	27.25	34	.83	
Total	31.43	35		

Critical $F(\alpha = .05) = 5.51$

The critical F-ratio of 5.51 was not met indicating no significant difference between the 5th-graders' timed scores on the Durrell oral reading paragraphs and the 70-percent comprehension scores on the same paragraphs.

Also looked at were the silent reading paragraphs of the Durrell. An analysis of variance was done to compare means of Durrell's method of arriving at a score by timing the test and using his norms or by allowing the child to read until his comprehension fell below the 70-percent level and using the paragraph number as the score. Data are reported in Table 6a.

Table 6a

Analysis of Variance of 4th Graders:
Silent, Timed and Silent, Untimed

Source	SS	DF	MS	F
Treatments	3.17	1	3.17	3.01
Error	27.34	26	1.05	
Total	27.35	27		

Critical $F(\alpha = .05) = 5.66$

There was no significant difference between the Durrell-derived silent reading scores and those arrived at considering comprehension alone in 4th graders.

Silent reading both timed and comprehension-based scores were analyzed for 5th graders and are reported in Table 6b.

Table 6b

Analysis of Variance of 5th Graders:
Silent, Timed and Silent, Untimed

Source	SS	DF	MS	F
Treatments	.75	1	.75	.77
Error	33.78	34	.97	
Total	33.78	35		

Critical $F(\alpha = .05) = 5.51$

The hypothesis was rejected when the calculated F-ratio was less than the critical F-ratio of 5.51. There was no difference between the scores earned in silent reading on the Durrell paragraphs using either the formal timed score or the informal comprehension score for 5th graders.

Comparisons were done to investigate whether there was a difference between untimed oral reading and untimed silent reading scores on the Durrell. The data on the 4th-grade section of the analysis appear in Table 7a.

Table 7a

Analysis of Variance of 4th Graders:
Oral, Untimed and Silent, Untimed

Source	SS	DF	MS	F
Treatments	2.29	1	2.29	1.64
Error	36.14	26	1.39	
Total	38.43	27		

Critical $F(\alpha = .05) = 5.66$

This analysis of variance showed no difference between the 70-percent comprehension level of reading on the Durrell oral and silent reading paragraphs scored according to paragraph-number read. Thus an informal reading inventory using the Durrell oral and silent

reading paragraphs would produce comparable results.

The corresponding analysis done on 5th graders is reported in Table 7b.

Table 7b

Analysis of Variance of 5th Graders:
Oral, Untimed and Silent, Untimed

Source	SS	DF	MS	F
Treatments	2.78	1	2.78	1.85
Error	51.11	34	1.50	
Total	53.89	35		

Critical $F(\alpha = .05) = 5.51$

Fifth graders showed no difference between oral and silent untimed scores when the Durrell Analysis was used as the measuring vehicle as shown in an analysis of variance. The calculated F-ratio did not meet the critical F-ratio of 5.51.

In view of the availability of the revised Spache formula for calculating readability and the fact that no differences were found between timed and untimed scores, the Durrell-designated grade levels for paragraphs of increasing difficulty appear to be deceptively high. Table 8a shows the comparison between the paragraphs on the Durrell oral reading subtest concerning the Durrell-designated reading levels

and those figured on the basis of the revised Spache formula of readability.

Table 8a
Readability Levels of Durrell Oral Paragraphs

Paragraph number	Durrell's level	Readability level*	Difference
1	1st-grade level	1.3 grade level	- .3
2	2nd-grade level	1.5 grade level	- .5
3	3rd-grade level	1.7 grade level	- 1.3
4	4th-grade level	2.0 grade level	- 2.0

*Revised Spache readability formula

The same analysis comparing Durrell's reading levels and the same paragraphs according to the revised Spache formula on the silent reading paragraphs are reported in Table 8b.

Table 8b

Readability Levels of Durrell Silent Paragraphs

Paragraph number	Durrell's level	Readability level*	Difference
1	1st-grade level	1.3 grade level	- .3
2	2nd-grade level	1.5 grade level	- .5
3	3rd-grade level	2.0 grade level	- 1.0
4	4th-grade level	1.9 grade level	- 2.0

*Revised Spache readability formula

Interpretations

The results of the additional statistical work indicate:

1. There is no difference between the oral-timed score and the oral-untimed score on the Durrell paragraphs at grade levels 4 and 5.
2. There is no difference between the silent-timed score and the silent-untimed score on the Durrell paragraphs at grade levels 4 and 5.
3. There is no difference between the oral-untimed score and the silent-untimed score on the Durrell paragraphs at grade levels 4 and 5.
4. There is a discrepancy on the Durrell oral and silent paragraphs between the grade levels assigned by Durrell and those arrived at using the Spache revised readability formula.

Summary

Poor readers seem to do equally poorly on all tests. They do, however, show improvement in what they retain in their reading comprehension as they mature with remedial help.

According to current readability estimates, the levels of the paragraphs in the Durrell oral and silent reading subtests may not be accurate.

Chapter 5

CONCLUSIONS AND IMPLICATIONS

Purpose

The purpose of this study was to analyze the relationship between rate of reading and achieved reading comprehension using the Durrell oral and silent reading scores which are based on the time it takes a child to read a selection and the actual achieved level of comprehension as arrived at by the Stanford Achievement Test. Statistical evaluations were done regarding: reading rate and comprehension achievement of 4th- and 5th-grade poor readers. Ways in which understanding of printed matter is determined were also studied. The investigation examined whether free recall of material was more effective than recall elicited by questioning and whether maturity of the reader made a difference in which method was more productive.

Conclusions

Overall findings pointed to the fact that within the context of this investigation, there was no difference between rate of reading of poor readers and their comprehension of printed matter. Neither did there appear to be a difference between their oral and silent reading rates. Poor readers did not seem to be aided by one method of information

retrieval over another, and time did not appear to effect the dependence on either questions or spontaneous recall in comprehension.

One interesting sidelight of this investigation showed that there was a significant increase in total comprehension over a period of three years when remedial help had been given. This gives evidence in support of continued remedial help over a period of years.

The children in this study may have had poor word recognition skills which could account for their seemingly low rate of reading. Their achievement was low so they were below the general level of 4th-grade reading achievement where speed begins to pick up according to the research.

It was found, however, that there was a difference in the amount comprehended over a period of three years indicating that maturity and/or remedial help might be a factor.

Implications for Research

This study was limited to poor readers. It would be interesting to investigate the relationship between rate of reading and achievement in comprehension in average and above-average readers.

Children appear to make common errors in certain Durrell oral paragraphs where the syntax of the selection may be at fault. For example, many children stumbled over and made the same insertion in the following sentence from oral paragraph number 4. "Henry goes to a large lake in summer" (Durrell, 1955, p.4) was often read as "Henry

goes to a large lake in the summer." In paragraph 2 another common error occurred. "He saw a boy he knew. The boy took him home." These sentences were often interpreted in this way: "He saw a boy. He knew the boy. The boy took him home." These errors took time to correct and may have made a difference in speed and continuity for the child.

The study could be replicated using the revised difficulty levels according to the Spache analysis. Since there is such a difference between the reading levels of the paragraphs according to Durrell and those arrived at by using the revised Spache readability formula, the true scores may give a more realistic picture of the child's functional level of reading.

Implications for Classroom Practice

1. Some children may need structure for recall of materials and others may need to rely on free recall of what they read. This appears to be in accordance with David Elkind's research on cognitive development and a child's ability to divorce himself from his own thoughts and ideas and pay attention to those of others. Questions and guidance may be in order to alert the reader's attention to pertinent material.

2. It takes time to change problem readers. This study showed that remedial instruction is effective especially in its cumulative effect over a period of years.

3. Since there was no difference between the timed scores on either the oral or silent reading paragraphs and the untimed scores derived by using a 70-percent comprehension base and the corresponding paragraph number, either may be used to arrive at a reading level on the Durrell test.

4. Since there was no difference between the scores obtained on the Durrell paragraphs either oral or silent and those of the reading comprehension score of the Stanford Achievement Test, either may be used to derive a reading level for a child.

5. The scores arrived at on the Durrell may need to be viewed as frustration levels rather than instructional levels for children and treated accordingly when prescribing for them. For example, if a child has successfully completed oral paragraph number 4 according to Durrell's instructions for scoring, the instructional level for that child in view of the Spache readability level on that paragraph may be beginning of second grade.

There is great value in the information a teacher can gain from listening to a child read orally. Judgments can be made on the types of errors the child makes which are valuable diagnostic aids in planning a remedial program. Durrell is concerned with the quantity of errors rather than the quality and type. It is valuable to listen to a child read and thereby diagnose his errors, but this can be done on any material not necessarily the Durrell paragraphs.

6. The oral and silent reading rates of poor readers were the same indicating a need for more time for these children when they are asked to do silent reading tasks especially in the upper-elementary grades.

Summary

This study has found the Durrell Analysis of Reading Difficulty with its reliance on rate of reading for ascertaining reading levels of children lacking in diagnostic value. The timed scores, the untimed scores, and the reading comprehension scores from the Stanford Achievement Test can be used interchangeably to derive a reading score. The question arises as to the value of that score in planning an instructional program for a child.

Poor readers did not show a dependence on either questioning or free recall in retrieving information from material read. Some children apparently need guidance in attaining comprehension and others do not benefit from that sort of programmed instruction.

This study did not find any difference between oral and silent reading rates of poor readers. In view of this finding that poor readers in the 4th and 5th grades do not read faster silently as the research has found to be the case for average readers in those grades, allowance must be made when assigning silent reading tasks for these children.

Finally, this study did find that poor readers show gains in overall comprehension whether by questioning or by free recall when they have received remedial help over a period of time. This information is valuable in long-range planning for poor readers and supports the cause of continued help for children who are experiencing difficulty in learning to read.

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APPENDIX

Table 9a. Data for 4th Graders

Subject	Age	Auditory quotient	Durrell Oral	
			Timed	Untimed
S ₁	9-4	130	4.8	4.0
S ₂	8-11	135	3.5	4.0
S ₃	9-3	116	3.2	4.0
S ₄	9-0	95	2.5	3.0
S ₅	9-5	105	3.5	4.0
S ₆	10-3	99	1.8	1.0
S ₇	9-0	102	2.8	2.0
S ₈	8-10	133	3.2	5.0
S ₉	9-1	113	3.2	4.0
S ₁₀	9-0	114	3.2	4.0
S ₁₁	9-0	105	2.5	3.0
S ₁₂	9-0	125	3.5	5.0
S ₁₃	9-9	126	3.8	4.0
S ₁₄	9-9	103	3.8	4.0

Note: Test scores are recorded as grade scores.

Table 9a (Cont.). Data for 4th Graders

Subject	Durrell Silent		S.A.T. comp.	Reading ^a expectancy quotient
	Timed	Untimed		
S ₁	4.5	4.0	3.6	88
S ₂	3.2	4.0	2.8	77
S ₃	2.8	3.0	2.7	80
S ₄	2.5	1.0	2.7	88
S ₅	3.5	4.0	2.7	89
S ₆	1.5	1.0	1.0	67
S ₇	2.5	1.0	1.6	86
S ₈	3.2	5.0	3.6	78
S ₉	3.2	4.0	2.4	84
S ₁₀	2.8	3.0	1.6	83
S ₁₁	2.5	3.0	1.6	82
S ₁₂	3.5	4.0	4.0	82
S ₁₃	3.5	3.0	3.8	77
S ₁₄	3.5	3.0	2.8	89

Note: Test scores are recorded as grade scores.

^aBased on an average of the Durrell silent and oral scores

Table 9b. Data for 5th Graders

Subject ^a	Age	Auditory quotient	Durrell Oral	
			Timed	Untimed
SS ₁	10-1	104	3.8	5.0
SS ₂	10-0	111	3.5	3.0
SS ₃	10-8	97	3.5	4.0
SS ₄	10-3	139	4.8	6.0
SS ₅	10-6	92	3.5	5.0
SS ₆	10-11	105	3.8	4.0
SS ₇	10-3	113	3.2	4.0
SS ₈	10-3	113	3.5	4.0
SS ₉	11-2	109	3.5	4.0
SS ₁₀	10-5	92	3.5	4.0
SS ₁₁	10-3	102	3.5	5.0
SS ₁₂	10-11	123	4.5	6.0
SS ₁₃	10-0	113	4.2	5.0
SS ₁₄	10-4	105	3.5	4.0
SS ₁₅	10-6	105	4.2	5.0
SS ₁₆	10-8	90	2.5	1.0
SS ₁₇	10-0	90	2.8	3.0
SS ₁₈	11-4	113	3.5	4.0

Note: Test scores are recorded as grade scores.

^aFor Subjects 1 through 9, test data was recorded in September, 1974.

For Subjects 10 through 18, test data was recorded in September, 1975.

Table 9b (Cont.). Data for 5th Graders

Subject ^a	Durrell Silent		S.A.T. comp.	Reading ^b expectancy quotient
	Timed	Untimed		
SS1	3.5	4.0	2.2	85
SS2	3.8	2.0	3.9	82
SS3	3.2	4.0	2.0	81
SS4	4.2	4.0	4.9	75
SS5	3.5	5.0	2.0	87
SS6	3.5	4.0	4.1	78
SS7	3.5	3.0	3.3	76
SS8	2.5	5.0	2.0	73
SS9	3.2	5.0	4.5	72
SS10	3.8	4.0	4.2	89
SS11	3.2	2.0	4.4	82
SS12	4.2	5.0	5.5	75
SS13	3.5	4.0	3.3	83
SS14	3.2	4.0	2.0	80
SS15	3.8	4.0	4.8	84
SS16	2.2	0.0	2.2	75
SS17	2.5	3.0	2.7	84
SS18	3.5	4.0	2.0	70

Note: Test scores are recorded as grade scores.

^aFor Subjects 1 through 9, test data was recorded in September, 1974.

For Subjects 10 through 18, test data was recorded in September, 1975.

^bBased on an average of the Durrell silent and oral scores

Table 10. Data on 5th-Graders' Durrell Silent-Reading Retention

Subject ^a	Paragraph level	Number of answers by recall	Number of answers by cued recall	Percentage of gain after prompting
SS ₁				
1973	1	3	1	33
1974	4	17	3	18
1975	4	17	3	18
SS ₂				
1973	2	10	0	0
1974	3	5	6	100.2
1975	2	6	4	67
SS ₃				
1973	1	5	0	0
1974	3	12	2	17
1975	4	16	3	19
SS ₄				
1973	1	3	1	33
1974	4	12	2	17
1975	5	14	2	14
SS ₅				
1973	2	10	2	20
1974	3	9	3	33
1975	5	13	3	23

Table 10 (Cont.). Data on 5th-Graders' Durrell Silent-Reading Retention

Subject ^a	Paragraph level	Number of answers by recall	Number of answers by cued recall	Percentage of gain after prompting
SS ₆				
1973	1	0	0	0
1974	4	14	6	43
1975	4	16	2	12
SS ₁₀				
1973	3	7	3	43
1974	4	15	3	20
1975	4	17	1	6
SS ₁₂				
1973	3	12	2	17
1974	4	20	0	0
1975	5	15	2	13
SS ₁₅				
1973	1	3	2	67
1974	1	4	0	0
1975	4	11	8	73
SS ₁₆				
1973	1	0	0	0
1974	1	2	1	50
1975	1	2	1	50

Table 10 (Cont.). Data on 5th-Graders' Durrell Silent-Reading Retention

Subject ^a	Paragraph level	Number of answers by recall	Number of answers by cued recall	Percentage of gain after prompting
SS ₁₇ 1973	1	0	0	0
1974	3	10	4	40
1975	4	20	0	0

^aData was available over a three-year period on these pupils.