EFFECTS OF RATE-CONTROLLED SPEECH, METHODS OF TESTING, SEX, AND TIME ON LISTENING COMPREHENSION

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PREFACE

Four groups of fourth-grade students listened to rate-controlled presentations in their own classrooms. The major task of the study was to determine the practicality of compressed speech in the typical educational environment.

Anyone conducting a study learns quickly that it is impossible to carry off the research alone. Others must help. Mr. James Thompson, Superintendent of Perry Public Schools, and Mrs. Carol Williams, Principal of Perry Elementary School, made the project possible by graciously providing their school system. To the teachers of the fourth-grade students in Perry who allowed me to disrupt their normal school activities seven times in as many days, Mrs. Berry, Mrs. Johnson, Mrs. Cowden, and Mrs. Dunbar, I owe a special debt of gratitude.

But as conducting a study takes help, the work necessary to gain a doctorate takes a special type of nurturing as well. Drs. King, Petty, St. Clair, and Johnsten are truly unique individuals. They taught me to think of earning a degree not as an award because an award suggests a termination of activity. To them, earning a degree is tantamount to dedicating oneself to a lifetime of professional endeavors.

To my wife, Karel, a special thanks is due. She provided great comfort and support as exampled by the evening before comps when she took me for a walk so I could regain some sort of focus and calm my nerves. Our children, Jon and Kristi, had a unique way of helping that tended to dull the sharp edges of taking exams. Thank you dearly.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

PROBLEM DEFINITION

Introduction

Regardless of their level, American students devote a great deal of time to the act of listening in normal classroom situations. In fact, it has been estimated that elementary students spend over 50% of their classroom time in listening activities while their counterparts in high school and college pay over 90% of their time in auditory exercises. (Hampleman, 1958; Wood, 1966; Rankin, 1928)

The fact that students do spend so much time listening has produced concern to many educators who have generally regarded the time spent in other learning activities to be of more worth. Consequently, these educators have looked to technology for help in their endeavor to free the students from needless hours of listening.

Technology has replied with several devices, not the least of which is an apparatus for "compressed speech". Essentially, compressed speech is the perceived acceleration of normal speech. Often referred to as "speeded speech" or "time-compressed speech", it involves the use of a specially-made audio tape recorder that can decrease the amount of time

requisite for any presentation while eliminating distortion. The recorder is designed to help increase efficiency in the classroom situation by allowing the student to learn more in less time.

In the initial trials of compressed speech, it has been demonstrated that students can gain information at a rate much faster than the normal rate of speech. Most of the work, however, has been conducted with sophisticated college or adult populations. Accordingly, before any statement as to the utility of compressed speech can be made for all levels, its effects (if any) on elementary students must be studied more intensely. Consequently, this study attempted to determine if any possible value arises from using compressed speech to present material to elementary children.

Statement of the Problem

In addition to the theory of the rapidity with which the normal human can process information which served as a motivation for this study, the basic problem addressed by this study concerned the educational practicality of the technology. Can students at the fourth-grade level comprehend material presented at a greatly increased rate? In addition, several other problems were examined by this investigation: Is there any improvement in comprehension scores due to practice? Does the sex of the subjects have any bearing on their comprehension of compressed speech? How much or how little practice is necessary before the subjects "peak" or reach their zenith in comprehension? Is it possible to predict which students will "catch on"

more quickly in comprehending compressed speech by using the initial reading rate as a predictor? Will any rate of presentation prove to be the most efficient as measured by the Learning Efficiency Index? And will there be any difference realized from the methods of test administration?

Statement of the Purposes

The purposes of this investigation were to extend the current theory of compressed speech by testing its effectiveness on elementary students; if appropriate, to delimit the minimum amount of practice required by the students before they reached a peak of performance equal to or surpassing the control; to determine if any correlation existed between reading rate and listening at compressed rates; to determine if the sex of the subject exercised any control over comprehension scores at accelerated rates; to determine if any differences in comprehension scores occurred as a result of two methods of test administration for comprehension; and to determine if one condition was the most efficient by using the Learning Efficiency Index (LEI) as an indicator.

Significance of the Study

One of the purposes of compressed speech is to accelerate classroom presentations in order to save the time of both the students and the teachers. The time saved can be applied to more worthwhile educational

pursuits of independent research, writing, etc. The theory supporting the possibility of compressed speech was proposed by Nichols (1955) who believed the human brain can process information roughly four times faster than the rate at which it is normally given material. While other researchers are hesitant to state definitely that four times is an accurate assessment, they do contend, nevertheless, that the thought rate is much faster than the speech rate. (Orr, 1964) Therefore, if this theory is true, it would seem plausible to suggest that humans could comprehend information from materials presented at rates much faster than those associated with normal presentation.

This study tested the theory that humans can ascertain meaning from increased rates of verbal presentation. In addition, this investigation tested the theory with students in their everyday classrooms.

Statement of Hypotheses

It was the major hypothesis of this investigation that fourth-grade students can gain information from material presented at a compressed rate. The hypotheses are stated more formally as follows:

Hypothesis 1: Rate of presentation will have no significant effect on the comprehension scores of elementary students.

Hypothesis 2: Comprehension scores will not be affected by sex and when scores are compared, the girls' and the boys' will not differ significantly.

Hypothesis 3: There will be no significant increase in comprehension scores as a result of practice.

Hypothesis 4: There will be no leveling off effect in comprehension scores before the seventh and final presentation of compressed material.

Hypothesis 5: There will be no correlation between reading rate and listening rate.

Hypothesis 6: There will be no significant difference in the efficiency measures of rates used.

Hypothesis 7: There will be no significant differences in comprehension scores as a result of the two methods of test administration.

Hypothesis 8: There will be no interaction effects of rate of presentation, sex, test administration, and time.

Operational Definitions

1. Compressed Speech. The process by which speech patterns are altered by the deletion of certain segments normally achieved by the use of specially-designed audio tape recorders which result in a decrease in time of presentation is commonly referred to as compressed speech, speeded speech, or rate-controlled recording.

2. Time-Expanded Speech. By using the same tape recorder designed for compressing speech, it is possible to lengthen or extend the time required to present a particular speech; or, to achieve the opposite effect of compressed speech.

3. Comprehension. The number of correct answers or scores on the instruments designed to elicit any possible gains realized by the subjects under treatment conditions.

4. Success. The students' capability of answering test items correctly as a result of the treatment passage.

5. Learning Efficiency Index (LEI). A method for measuring the efficiency of a particular treatment computed by subtracting the control mean from the treatment mean and dividing the result by the listening time in minutes.

Limitations

The results of this study are generalizable only to fourth-grade students from a similar environment.

Assumptions of the Study

The major assumptions of this study were:

1. All students answered the examinations honestly.

2. Through proper counseling, the teachers involved did not feel any pressure to have the "best" class.

3. Also, the cooperating teachers treated the study as fairly as possible.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

Since American students do spend so much of their time devoted to listening activities, work must be done to see if compressed speech has any application in the classroom. In addition to testing for the hypotheses, this study is designed to take the technology making compressed speech possible out of the laboratory and place it into the environment of students who must eventually use it if the process is ever to go beyond experimentation.

This chapter will present much of the work that has been done with compressed speech. It deals with the various independent variables that have been used by previous researchers on the major dependent variable of interest: Listening Comprehension.

Listening Comprehension

The foundations of compressed speech start with the act of listening, for without the facility to listen, any possible use of an accelerated rate of oral presentation would be nil. In general, listening "refers to the assimilation of spoken symbols, the mental process involving meaningful interpretation and understanding of ideas as apprehended from a total selection." (Fergen, 1954, p. 9) It is different from, yet requires, hearing, which is simply the awareness of sounds. However involved the process of listening is, it has been often overlooked as an important aspect of effective communication. (Hampleman, 1958)

Historically, in the art of communication, the major burden for the successful conveyance of a message has been carried by the speaker. Perhaps understandably so, for the speaker is usually the center of attention. Even during the days when Rome was a great empire, the orator was considered so important that it made little difference what he said as long as his speech was eloquent. "Rhetoric was no longer to persuade, but to please." (Gwynn, 1964, p. 248) As a result of the overemphasis on speaking, the act of listening received less and less attention and it assumed a passive role. (Wendall Johnson (Duker, 1966) p. 34.)

Consequently, in spite of, or perhaps because of, the assumed inherent passivity of the act of listening, it has long been the major tool used in the education setting. Accordingly, the students spend a great deal of their time in the classroom by listening. (Rankin, 1928;

Hampleman, 1958; Wood, 1966) The students devote most of their time to listening even though the act is not generally considered an efficient avenue for learning. (Hampleman, 1958)

However, inconsistent with listening's assumed passive role and the equally assumed inefficiency of the act, listening is the primary, if not the most important, avenue of learning for the elementary child. (Hampleman, 1958; Sticht, 1968; Barnard, 1969; Durrell, 1969; Thompson and Silverman, 1977; Riding and Vincent, 1980) It has been suggested that the main means of informational input for children up to the fifth grade is the process of listening. (Sticht, 1968) At the time the student has entered the fifth grade, a slow equalization of reading and listening as modes of learning has begun. (Barnard, 1970; Durrell, 1969) Upon entering the seventh grade, reading has emerged as the most important means for gaining information. (Coughran, 1953) Yet, at least one study (Bradtmueller, 1978) has shown that for some students, listening remains the primary avenue of informational input well into the eighth grade. With the importance of listening in the educational process established, it becomes imperative that appropriate means be found to allow students to achieve the most they can for their expenditure of classroom time. It was this concern for the listener in the communication process that laid the foundation for compressed speech.

In 1955, Nichols called attention to a phenomenon that should be of great interest to educators. He noted that the rate at which the normal human can process information is roughly four times faster than the rate at which the material is normally presented. (Orr, 1964; Thompson and Silverman, 1977) In later years, Miller (1956) attempted to

substantiate Nichols' claim by feeding isolated bits of information to subjects in the hope that he might be able to determine how many bits a human could process at one time. His conclusion was simply "five plus or minus two." The main point of the Nichols and Miller studies is that the thought rate is much faster than the rate of speech.

For educators in the classroom, the realization that the thought rate is much faster than the normal speech rate is very important. Foulke (1968) and Orr and Friedman (1968) concluded that the average rate of normal speech ranges from 125 words per minute to 175 wpm. In Oklahoma, the rate is 169 wpm. (Miller, 1979) Since evidence suggests that students can process information much faster than the normal rates of presentation which is used in most classrooms, they may either become bored or simply fill in the time between aural messages with other thoughts. (Woodcock and Clark, 1968; Duker, 1974)

Consequently, perhaps anticipating the conclusions of Nichols, Miller and Licklider (1950) demonstrated the feasibility of "speeded speech" by playing a tape on a tape recorder at a speed faster than originally recorded. While they proved that "speeded speech" was intelligible, they also encountered an inherent problem of playing a tape faster than its recording speed. the tape produce a "Donald Duck" effect; therefore, "time compression was gained at the expense of pitch preservation." (Gerber, 1968, p. 272)

In 1953, Garvey painstakingly cut out certain ordered segments of an audio tape and found upon replaying it, he had not only extinguished the high-pitched "Donald Duck" effect, but also, he found the result to be intelligible. At almost the same time, Fairbanks (1954) "published the design for a machine to do what Garvey had done by hand." (Orr and

Friedman, 1968, p. 196) The findings of Fairbanks et al. (1957a, 1957b, 1957c, 1957d) confirmed Garvey's earlier findings.

The Effects of Rates of Presentation

In the years that have followed Fairbanks' development of a tape recorder for the compressing of speech, clearly, most of the research has been conducted on the college student or adult population. Only a few investigations published at this writing have studied the effects of presentation rate on elementary students. In general, the researchers have mixed results in trying to verify that elementary students can gain material from compessed presentations. Fergen (1954), using phonograph records, recorded material at rates of 80 wpm, 130 wpm, and 230 wpm from the Iowa Every Pupil Test of Basic Skills and presented the material to fourth-, fifth-, and sixth-grade students. She found that the rate of 130 wpm was most successful while 80 wpm was next to the best.

Wood (1966) conducted a study with a population composed of first graders, third graders, and fifth graders. He presented five sentences at ten rates in increments of 25 wpm, ranging from 175 wpm to 400 wpm. He found that comprehension dropped slightly at higher speeds but no grade did worse than 75% when tested. It is interesting to note that Wood used short command sentences such as, "Rub one of your elbows." When the students responded appropriately such as by rubbing one of their elbows, they were judged to have comprehended the material.

In conjunction with Wood, Woodcock and Clark (1968) presented three pieces of narrative material, ranging in rate from 78 to 428 wpm in

increments of 50 wpm. The contents of the three passages were concerned with Marco Polo, Dick Whittington, and Roland, all judged to be interesting to the one hundred sixty-two elementary subjects with mental ages falling in the 9-4 to 11-3 range. The subjects were divided according to high I.Q.'s, average I.Q.'s, and low I.Q.'s. The subjects were randomly assigned to the nine treatment groups containing six members each. They were presented two passages as a means of familiarization to the rate. Then, after a criterion passage was presented, the researchers found that subjects with low I.Q.'s performed better at slower rates than they did at what were the most efficient rates for students with high I.Q.'s. Further results indicated that the rates of 228 wpm to 328 wpm were more efficient for learning than the normal rate of 178 wpm.

Similarly, Barnard (1970), working with ninety-two sixth-graders, selected five narrative stories from the SRA Reading Book One to be recorded at rates of 125 wpm, 200 wpm, and 275 wpm. On the basis of pretests with the Gates-MacGinitie Speed and Accuracy Test and the Sequential Tests of Educational Progress, Listening (Form 4), he divided the students randomly assigned to three groups into subgroups. For his study then, he had four major groups composed of high listening-high reading comprehension subjects; high listening-low reading comprehension subjects; low listening-high reading comprehension subjects; and low listening-low reading comprehension subjects. Each group was further divided into three groups in order that each subgroup would hear the stories at one rate of presentation. The Durrell-Sullivan Reading Capacity Test was used to measure the relative gain for rate of reading comprehension and listening comprehension. For all groups, however, the

rate of 125 wpm produced greater gains even though the rate of 275 wpm was judged to be the most efficient.

Overall, investigations dealing with rate-controlled recordings have utilized many speeds of presentations. There is some agreement on what should be considered the normal range but on what should constitute the extreme tends to be left open. Foulke (1968), Woodcock and Clark (1968), Reid (1968), and Miller (1979) used the range of 125 to 178 wpm as normal. Foulke (1968), in averaging the rates used in Talking Books, found that 175 wpm was the most used speed. In a later study of Talking Books, DeWeaver (1979) found only an eleven word difference at the rate of 164 wpm. In trying to determine the average speaking speed of native Oklahomans, Miller (1979) found 169 to be average.

At slower speeds, Fergen (1954) used the rate of 130 wpm, while Woodcock and Clark (1968) used 78 wpm as slowest speed. Barnard (1970) used 125.

On the high end, Woodcock and Clark (1968) found that the range 228-328 wpm was the most efficient rate of presentation. Orr and Friedman (1968, p.228) summarized several studies by stating that the rate "275-300 wpm seems to be about the right range." Their conclusion took into consideration some of their studies where they used 475 wpm as the extreme high end of their scale. Beatty, Behnke, and Froelich (1980) used 280 wpm as the top range of their study with some conditional success. To Hausfeld (1981), 290 wpm was "the optimum" based on his research. Interestingly, as the years have passed since Orr and Friedman's use of 475 wpm as their top speed, successive researchers have tended to use slower rates as their extreme highs.

The Effects of Sex

Researchers investigating the importance of the subject's sex as a possible effect on the comprehension of compressed presentations have been unable to reach consistent findings.

Fawcet (1966) conducted a study on six-hundred thirty-eight subjects from the fourth through sixth grades. The subjects were divided into two groups and matched according to intelligence and reading level. The Sequential Tests of Educational Progress; Listening (Form 4) was the instrument used to measure the listening ability of the subjects. The conclusion was reached that sex was not related to listening ability. Fawcet's findings corroborated earlier results obtained by Hollow (1955) and Brown (1965).

However, contrary to the reported findings of Hallow (1955), Brown (1965), and Fawcet (1966), Goldhaber and Weaver (1968) found a difference in listening comprehension between the sexes. They randomly assigned two hundred-forty subjects to treatment conditions of four different rates of presentation. The rates used were 175 wpm, 375 wpm, and 425 wpm. The messages totaled three and all concerned the history of radio. One presentation was used as a means of familiarization, followed by a short three-item practice test. The remaining two passages were presented followed by a multiple-choice test after each. The results were contrary to the expectations of the researchers. The explanation was that "those differences might . . . be attributable to the information presented in the stimulus message. . . . The history of radio and television may have . . . appealed more to males than

females." (Goldhaber and Weaver 1968, p. 25)

In spite of the misgivings Goldhaber and Weaver had for their findings, they were supported by Riding and Vincent (1980) who also found a difference in the abilities of boys and girls to comprehend rate-controlled recordings. Riding and Vincent rearranged twelve pairs of sentences that were basic to a 398-word prose passage about the history of salmon. "Each sentence in the pair contained information which was partly repeated and then elaborated in the second sentence." (p. 261) The researchers produced two forms by 1) keeping the pairs close together or by 2) separating the pairs. Two rates of presentations were made (73 wpm and 198 wpm) of each passage to four randomly allocated groups of 160 children in chronological ages of 7, 10, 12, and 15 years with an equal number of boys and girls in each group. Group 1 heard the slow presentation with sentences adjacently positioned; group 2 heard the fast presentation of the same material. Group 3 received the "distantly positioned material" at the slow rate; and group 4 listened to the fast rate of distantly positioned material. The authors reported close positioned material is preferable to distant; girls do better than boys when the related details are distantly positioned when they have time to process the material. At the faster pace of the distantly positioned material, the boys did better. Overall, however, in the study, the researchers note boys tend to out-perform girls at the more accelerated rates of presentation which may indicate they have a shorter "working-memory processing" time.

The Effects of Difficulty of Stimulus Materials

Under the impression that the difficulty of material does affect listening comprehension, Spicker (1964) presented three passages written at the third-, fifth-, and ninth-grade levels to forty-four normal and forty-four learning disabled students with mental ages between ten and eleven. It was expected that when tested, the students would have higher comprehension scores on the fifth-grade material. In fact, the scores were higher for fifth-grade material and when the subjects were tested for retention, the fifth-grade material proved preferable.

Goldhaber and Weaver (1968), as an additional question of their study presented earlier, observed the effects of material difficulty. For their two hundred forty college students, material was written at the graduate level, the college freshman level, and the eighth-grade level. Their findings were that comprehension scores were higher on the freshman level material.

The Spicker, Goldhaber and Weaver results tend to corroborate the earlier findings of Harwood (1955), who presented stories at seven levels of difficulty to four hundred eighty-seven tenth-graders at rates of 125 wpm, 150 wpm, 175 wpm, and 200 wpm. The participants were randomly assigned to four groups and each group heard the stories only at their assigned rate. The conclusion was that difficulty of material could affect comprehension.

In his study, Hausfeld (1981) attempted to match an appropriate rate with the level of material. He used six prose passages extracted from

SRA Reading Laboratory IVa. Three of the passages were for reading age 13, called easy, and three were for age 19, judged to be "difficult". Thirty psychology students were treated to the passages at rates of 180 wpm, 290 wpm, and 380 wpm. He found difficulty of material to have an effect. Based on his findings, he was able to conclude the "optimum speed is 290 wpm for difficult and 290 or 380 wpm for easy material." (Hausfeld 1981, p. 316)

The Effects of Training Aids

In attempting to determine some form of training aid to enhance the comprehension of compressed speech, Orr and Friedman, in 1967, matched "three small groups of college students" on the basis of comprehension scores of a passage presented at 175 wpm. They presented the material from the novel Run Silent, Run Deep at 375 wpm to the groups for a five-day investigation. Before each presentation, he allowed one group two and one-half minutes to study a precis of what they were going to hear; another group was given a list of one hundred thirty key words contained in the material; and the third group merely listened. The authors concluded the findings by noting that, "the two types of listening aids here employed did not improve comprehension of time-compressed speech as compared to the performance of the control group." (p. 226) In summarizing the results of various studies, Foulke (1968) concluded that there were no training aids in existence that were of value.

The Effects of Practice

Voor and Miller (1965) presented five stories of about 1,350 words in length from SRA Better Reading Book Three to fifty college freshmen and sophomores at the rate of 380 wpm. It was reported that the scores of comprehension examinations gradually increased until after the third presentation. For the remaining two, the scores of the subjects remained relatively unchanged. It was concluded that practice was necessary.

Harley (1966) concurred with Voor and Miller in a small study during which he presented a section of Adventures in English textbook at a rate of 275 wpm to five male and ten female high school seniors. With an initial mean comprehension score of forty-three out of a possible one hundred points, the score increased after the second presentation and remained practically stable during the rest of the study.

Not unlike Voor and Miller and Harley, Orr, Friedman, and Williams (1965) conducted an investigation with thirty-two [originally thirty-six but the number decreased through attrition] male freshmen and sophomore students from four colleges surrounding Washington, D. C. The subjects were administered a form of the Nelson-Denny Reading Test which allowed the matched division of subjects into two groups, experimental and control. Both groups were tested at a rate of 175 wpm and there was no significant difference found. Then a benchmark passage from Cheaper by the Dozen was presented at 475 wpm, also with no difference. The experimental students then were allowed to listen to the entire novel for the rest of the week at 325 wpm. At the end of the week, both

groups were administered a passage at 325 wpm. The experimental students had a higher mean than the control group. The general design continued for four weeks until the experimental students had worked up to 475 wpm. Following the final test passage of 475 wpm, a point of significant difference in favor of the experimental students was realized. In the conclusion of the study, it was noted that, " . . . with 8-10 hours of training, substantially higher speeds are possible." (Orr, Friedman, and Williams, 1965, p. 156)

The importance of practice was further noted by Napier (1968). In her study using sixty-four fourth- and fifth-graders, she presented material in the rate range of 160 wpm to 367 wpm. She gave thirty-four two-day lessons, during which three quizzes were administered each time. Pitting two groups of fifth-graders against a single group of fourth-graders, she was surprised to find that the fourth-graders who had more practice out-performed both groups of fifth-graders. The excelling fourth grade proved that training alone accounted for the success.

Realizing that practice is important, Orr and Friedman (1968) performed an investigation in order to find out if a large amount of practice would result in near perfect comprehension of material presented at 425 wpm. A small group of subjects numbering only seven practiced seven hours a day such as five days by listening to material like Cheaper by the Dozen and Diary of a Young Girl at 425 wpm. Although comprehension improved from 40% to 70%, it was judged insignificant when compared with three previous groups that had averaged only 12 to 14 hours of practice. In other words, while practice is important, over fifteen hours of it is hard to justify.

Lass, Foulke, Nester, and Comerci (1974) tested the effects of training or exposure to compressed speech on college subjects' comprehension and listening rate. The subjects listened to time-compressed prose during 12 sessions over a six-week period with each session devoted to an increase of 25 wpm over the previous session. The rates began at 225 wpm and ended at 350 wpm. A control group received no such exposure. At the end of the six weeks, both groups were given listening rate preference and comprehension tasks, the results of which were compared to a pretest. The practice tended to cause the subjects to increase the speed of their listening preference but did not improve their comprehension.

Wallace and Koury (1981) whose study dealt with both the effects of practice and intelligibility is reported more fully in a later section dealing with intelligibility. However, of importance here, their research indicates practice is necessary because an experimental group listening to tapes with frequency shift accompanying acceleration without pitch control was able to comprehend material better than a control group that received no practice.

The Effects of I. Q.

Although the use of I. Q. in studies of compressed speech has fallen from favor for reasons concerning the subject's right to privacy, some researchers have performed investigations using the quotient. In the main, the significance of I. Q. has been found to be difficult to demonstrate.

Woodcock and Clark (1968), with a population of one hundred sixty-two elementary students, noted that although the most efficient rate for all groups (divided by I. Q.'s) was between the 228 wpm and 328 wpm range, the subjects with lower I. Q.'s performed better at slower rates than did the high I. Q.'s at the most efficient rates. In general, Barnard (1970) reported similar results.

However, in contrast, Wood (1966) noticed that while comprehension dropped slightly at higher rates, intelligence was found to have no effect. McNutt and Li (1980) reported more fully in a section dealing with learning disabilities, in noting the uncertainty of the issue were careful to insure that the I. Q.'s of all participants were close to the average range.

The Effects of Methods of Administration of Tests of Comprehension

By far most of the studies conducted have utilized a written instrument to measure listening comprehension. Barnard (1969) utilized a self-conceived instrument of multiple-choice design with five possible answers. Foulke (1968) tested the effects of rates in increments of 25 wpm from 125 to 400 wpm on comprehension by administering a multiple-choice examination to his three hundred sixty college students. In their study, Friedman and Johnson (1968, p. 214) also used a multiple-choice examination although they "recognized that a multiple-choice test was not an uncontaminated measure of listening comprehension." They were concerned that the written test might, in

actuality, measure merely the subject's ability to read.

Friedman and Johnson were not the first to question the wisdom of measuring listening comprehension via written examinations. Kelly (1967) addressed his attention to many variables of test construction and suggested "that our traditional procedures for testing listening are sterile, as customarily used." (p. 453) The problem of test administration was also felt by Wood (1966), who, by compressing simple commands, decided that his subjects had comprehended the message when they overtly responded by performing the task appropriately. He became the first to test listening comprehension through only the auditory channel. Thompson and Silverman (1977), DeWeaver (1979), and McNutt and Li (1980) have followed suit by administering a comprehension test orally.

The Effects of Intelligibility

In the years of researching the effects of different factors on the comprehension of compressed speech researchers have recently turned their attention to the intelligibility factor. That is, can it be understood? In order to be comprehended, the process must produce intelligible messages.

Carroll and Cramer (1969) were concerned with the intelligibility factor of the process of compressing speech. By working with seven rates in a range from two to five times the original rate of speech, they made several conclusion. They found that the use of headphones increased intelligibility by about 22% over the average presentation

with a loudspeaker. Further, they observed that sampling intervals should be held constant for the high rates they used. At the time of their study, most of the commercial equipment available varied the sampling interval but maintained a constant discard interval which meant that at high rates, less sampling occurred which hindered intelligibility. Their findings indicated that at the high rates the sampling interval should be held constant. However, in the studies of recent years, few have dealt with speeds of two to five times normal.

In their study on the effects of achievement incentive and rate on comprehension, Beatty, Behnke, and Froelich (1980) tested their material with randomly selected subjects who were not a part of the main study. As part of the standard "Articulation Test for Intelligibility" (ATI), parts of the tapes at all rates were played to the subjects who were to repeat what they heard. A percentage based on the correct answers divided by the total responses possible was reported.

Wallace and Koury (1981) produced tapes of accelerated presentation at rates of 195 wpm (normal in their study), 331.5 wpm, and 390 wpm. One set of tapes were frequency corrected [when accelerated, frequency shifts also] and the other sets were not. Using three groups, one as a control and the other two as experimental, the researchers found the frequency shift tapes were comprehendable with practice. This was significant since Kurtzrock (1957) reported intelligibility to be considerably sensitive to and harmed by frequency distortion. In their study, the frequency controlled tapes produced the better comprehension results although all scores tended to fall at the twice-normal speed. By using 20 sentences, four as warm up, eight at 331.5 wpm, and eight at 390 wpm followed by another set of twenty sentences utilizing the same

sequence, the researchers found the frequency-shift group did better than control as a result of practice. The frequency controlled group, however, performed best of all.

The Effects of Reading Rate

The results concerning the effects of reading rate on comprehension of compressed speech are somewhat sketchy. Orr, Friedman, and Williams (1965, p. 152), in a "very tentative result", noticed that in using alternate forms of the Nelson-Denny Reading Test as pretest and posttest, "there was a hint of relationship between reading and listening speeds." The conclusion was based on the fact that the "sharpest decline in listening comprehension tended to occur at about the final mean reading rate." (Orr, Friedman, and Williams 1965, p. 152) They further reported that the reading rate of the subjects increased during the study.

However, in order to check the potential for affecting reading rate by means of an accelerated presentation, Reid (1971) worked with sixty second-graders and found no significant difference in reading comprehension as a result of using compressed speech as a pacer. As a result of administering the Stanford Diagnostic Reading Test, Level I (Form W), she obtained four distinct levels of reading activity. She randomly selected representatives of each level to 1) listen to stories at one of three compressed rates and 2) listen to stories at one of three compressed rates while simultaneously reading the stories. The rates selected were 125 wpm, 175 wpm, and 225 wpm. She found after

administering Form X of the above mentioned instrument that listening and reading was more efficient than mere listening. But, as for reading comprehension, there was no significance to be reported.

Rossiter and Thames (1972) were also interested in using compressed speech to increase reading rate. They randomly divided forty-six high school sophomores into two groups. While one group (control) merely read ten short stories taken from Adventures in Appreciation, Volume 1 and Striving, the experimental group listened to audio tapes as a reading pacer during the time they also read. By increasing the word rate in increments of 50 wpm every other day, a total rate of 350 wpm was reached. The conclusion was drawn after examining the two groups that "Reading practice with accompanying compressed speech as a pacer resulted in a significantly greater increase in reading rate without accompanying loss in comprehension." (p. 40) Does it follow, then, that if compressed speech used as a pacer may increase reading rate, will initial reading rate serve as a predictor for listening rate?

As a part of Hausfeld's study (1981), the effects of reading speed of adult subjects on their comprehension of compressed speech were analyzed. In a very good discussion of the processes of reading and listening, he concluded that though different at the beginning both processes end similarly. "Given that reading and listening involve different perceptual processes, it is interesting that the effects of both speed and difficulty on comprehension levels are the same." (p. 317) He found no quantitative differences in comprehension between listening and reading. He did conclude that reading and listening comprehension were related to the subject's habitual reading speed.

The Effects of the Narrator's Voice

The subject of the narrator's voice has received some attention since it has been felt that given the nature of compressed speech, a certain type of voice is probably necessary if successful comprehension at high rates is to be achieved.

Carroll and Cramer (1969) tested extreme rates of two to five times normal by comparing different types of equipment, sampling intervals, discard intervals, and narrator's voice. They concluded that a sampling interval of 15 milliseconds was optimal at all rates for a low-pitched male's voice. A higher pitched female's voice required a shorter sampling interval. But since two times normal tends to be the top end of the range of most studies of compressed speech, their findings provided little of substance except that at the lower speeds, either a male or a female could be used a narrator.

However, to Thompson and Silverman (1977), the question was not necessarily the speed of the discourse but the speaker. Would the children's familiarity with the speaker affect their comprehension of speeded presentations? The researchers took two groups of twenty-one third graders and presented a 940 word narrative passage at a rate of 275 wpm. The reader of the passage was the teacher of the experimental group. Each subject listened to the passage and then responded to ten questions about the final three-fourths of the passage. Although the experimental group had a higher mean of scores (correct answers) than the control group, the former's familiarity with the speaker was found to be not significant. Of further interest, the narrator of the

compressed material was a female. Similarly, McNutt and Li (1980) used a female narrator for their study. It appears that the sex of the narrator is unimportant when the rate falls below two times normal.

The Effects of Learning Disabilities

DeWeaver (1979) questioned the effects of rate-controlled recordings on the comprehension of non-blind handicapped students. She noted that the Library of Congress had added playback controls to its cassette units which allow speeds from 20% slower to 70% faster but "alterations in speed can only be accomplished with Talking Book equipment if the listener is willing to tolerate alterations in pitch." (p. 202) She observed a conflict in research findings as to the kind of listener who could profit by such rate changes and what change resulted in improved comprehension. To test for answers, she studied forty-eight students in grades one to six who were all multiply-handicapped children. She tested listening ability with the "Detroit Test of Verbal Opposites" (DTVO), a subtest of the Detroit Test of Verbal Abilities. To be included in the study, the subjects had to achieve an auding age of 5. Of the forty-eight, she divided the subjects into two groups of twenty-four. One group was composed of children with a chronological age of five to nine years and the other ten to fifteen. Each group received the Spache Diagnostic Scales Instructional Level to test reading ability. Each group contained an equal number (12) of remedial and average readers. Three selections of 400 words were presented at normal speed (164 wpm), one at a compressed rate of 25% (203 wpm), and

one expanded by 25% (123 wpm). Lots were drawn to determine the order of treatment. On an individual basis, the researcher played one treatment, stopped the recorder, asked questions concerning the contents of the tape. At the conclusion of each question, multiple-choice stimulae were provided orally. After the subject's selection, the researcher circled the response and continued. The results showed significance only in favor of the expanded rate when compared with the accelerated. Accelerated and normal were found not to differ significantly as well as normal when compared to expanded. Reading ability was found to have no effects on comprehension of rate-controlled recordings.

McNutt and Li (1980) turned their attention to learning disabled (LD) children. Ten learning disabled subjects and ten normal subjects received auditory acuity checks and were found normal. Sentences composed of five to 17 morphemes making up two lists were recorded by a female voice at a normal rate of four syllables per second. By electronic means, the two lists were re-recorded at 60% and 30% compression and at 30% and 60% expansion. In a quiet room, the stimulus material was presented to the subject wearing headphones preceded by familiarization examples. Subjects were asked to repeat verbatim the stimulus sentence which was presented only once. The subjects' responses were recorded for later analysis. Additions, omissions, and/or reversals were considered errors. There was a significant difference between the groups in favor of the normal subjects. Even though at 60% compression the rate equaled 411 words per minute, there was no difference of significance between the rates for the normal subjects. For the learning-disabled group, there was a significant drop

in comprehension at the 60% compression rate, but none of significance at the other rates. In reporting their work, the researchers concluded, "these findings suggest a semantic or syntactic deficit in the processing of rapidly presented auditory material rather than a deficit in short-term memory." (McNutt and Li 1980, p. 30) Their conclusion tends to be corroborated by related research conducted by Cermak, Goldberg, Cermak, and Drake (1980). Instead of increasing amounts of information presented, they increased periods of silence and tested the effects on recall and found that, at least on their test, learning disabled children were not at a significant disadvantage.

Summary

Materials provided in this chapter have provided a definition of the major dependent variable [listening comprehension] from pertinent studies dealing with compressed speech. Additionally, eleven independent variables that have been used in studies through the years of research in rate-controlled recordings were presented.

CHAPTER III

METHODOLOGY

Introduction

The purposes of the present study were to investigate the effect of compressed speech on fourth-grade students, to delimit the minimum amount of practice required by the students before they reached their peak in comprehension, and to determine if any one rate was the most efficient as measured by LEI. Further, the study was designed to determine if any differences in comprehension scores occurred as a result of the two methods of test administration, and to determine if any differences in comprehension scores occurred as a result of sex. This section describes the methods used in the study to select subjects and to assign treatments; the instruments used; the experimental design; the procedure of the study; and the data analysis used.

Subjects

The subjects for the study were from a local elementary school

(Perry, Oklahoma) in which there were four fourth grades to which the principal randomly assigned students. There was a total of seventy-nine students enrolled in the fourth grade class at Perry during the fall term 1983 when the investigation was conducted. The students were within two grade levels of fourth-grade reading and listening comprehension as measured by the STANFORD ACHIEVEMENT TEST.

Method of Assignment to Treatment

Four groups, comprising three treatments and one control, were randomly assigned by drawing the room numbers of the four grades from a box. Simultaneously, from another box, the treatment conditions were drawn. Therefore, one room number was drawn and immediately its treatment condition was drawn.

At the conclusion of the assignment of treatments, each group was divided in half for the two methods of test administration. Each student was assigned a random number that allowed the random assignments to be made.

Since the students met the conditions of the screening tests, all were used to provide enough numbers to maintain the integrity of the study against a sampling bias brought on by sickness or high, unusual absenteeism on the days the study was conducted.

Instrument

The students' reading rates were measured by using level B of the "Reading Rate" section of THE NELSON READING SKILLS TEST. The section presents a short story of forty-four lines that the students read for a one-minute interval. At the end of the time allotted, the students marked their progress and took a short test to assure against inflated rates.

In explaining their instrument to users, the authors of the test stated:

> "The directions for the reading rate subtests and the existence of the five comprehension check questions that accompany [the] form were designed to create an initial set that, although the emphasis is definitely on speed, some comprehension is expected. These questions were also designed to insure that at least a modest level of comprehension is reached."

A total of 59 public school districts and private and parochial schools participated in the standardization procedures. One of the participants was an Oklahoma school. By employing the equivalent-halves method of testing reliability, the authors obtained a coefficient of .93 for total reading.

The second instrument used in this study, THE STANFORD ACHIEVEMENT PRIMARY LEVEL III, provides a measure of the student's basic listening comprehension which was also compared with the dependent variable of comprehension of rate-controlled recordings, although the primary emphasis was to serve as a screening device, there were positive correlations on written and listening testing methods with listening and reading comprehension.

The authors of the Stanford test reported a split-halves reliability of .96 for reading comprehension and .88 for listening comprehension. Although the test is designed to assess several areas of achievement, only the comprehension scores on listening and reading were of interest to this study. But in reviewing the test for Buros (1978), A. Harry Passow noted the test provides a useful measure of aural language competency and when combined to form a "total auditory score do show high correlation with most other tests." (Buros 1978, p. 104)

Two claims made for the Listening Comprehension section by the authors of the achievement test are: 1.) the test provides information on pupils' language competence when combined with vocabulary; and 2.) it provides "a unique indicator of school success" since much of what children learn is through the media of speech and hearing. (Buros, 1975)

In the tests, items move from simple words to sentences and to paragraphs. The stories are designed to appeal to a wide variety of students from diverse backgrounds. The items tend to deal with explicit and inferential meanings instead of global.

The NELSON test was selected for its ease of administration and its reported quality. It was used to provide the basic reading rate to be compared with the students' listening rate. The STANFORD test was selected because of its comprehensiveness and its inclusion of reading and listening comprehension scores. These scores were used to insure normalcy (students at or near grade level performance) of the students in the study.

Experimental Design

In order to test the hypotheses of the study, the design is an adaptation of Campbell and Stanley's (1963) "pretest-posttest control group design". In this case, the control group received a treatment similar to the experimental groups except that one of the independent variables (rate of presentation) was neither compressed nor expanded. Materials for the control group were presented at the "normal" speed of 175 words per minute. In this way, the comparisons were actually of specific activities. The strength of this design answered the charge of Campbell and Stanley (p. 13) that traditional pretest-posttest control group design often adds undesirable ambiguity to the interpretation of the contribution of the experimental treatment because the usual comparisons are of treatment compared to whatever "filled the time" of the control group at the time of experimentation.

With "R" indicating randomization; "C" standing for control; "X", the treatment; and "O", the observation for effects or in this case, the test, the study took the following form:

$$
\begin{array}{ll}
R_1 & X_1O_1\ X_2O_2\ X_3O_3\ X_4O_4\ X_5O_5\ X_6O_6\ X_7O_7 \\
R_2 & X_1O_1\ X_2O_2\ X_3O_3\ X_4O_4\ X_5O_5\ X_6O_6\ X_7O_7 \\
R_3 & X_1O_1\ X_2O_2\ X_3O_3\ X_4O_4\ X_5O_5\ X_6O_6\ X_7O_7 \\
C_1 & X_1O_1\ X_2O_2\ X_3O_3\ X_4O_4\ X_5O_5\ X_6O_6\ X_7O_7
\end{array}
$$

The four groups were randomly assigned to rates of presentation

treatment. Seven treatments were followed by seven tests. The pretest followed an initial "warm up" exposure to a rate-controlled presentation. After the seventh treatment, a posttest was administered. In this way, the effects of the six treatments in between exposed any growth in the ability of the subjects to withstand compression or to demonstrate the effects of training.

According to Campbell and Stanley, there are two possible threats to the external validity of the design utilized in this study. One is the interaction of selection and treatment and the other is possible reactive arrangements. The authors raise the possibility that certain characteristics of the locale of the study might affect the outcome. While this was a possibility, there is little to suggest that Perry as a school or community is radically different from any other community in Oklahoma. Perry, like most towns in the state, has its major industry, is rural in scope, is removed from, yet close to, a college campus, and has five medical doctors serving its 5,000 citizens. However, in spite of this claim for the average, the possibility of an unknown does exist therefore caution must be used in applying the findings of this study to populations other than elementary students in communities of this nature.

The more serious threat to external validity is reactive arrangements. Basically, this refers to the artificial environment which accompanies most studies. For this reason, the teachers accepted and used the treatment materials as part of their normal day's activities. The teachers were counseled that in no way would the results suggest any type of superiority of teaching method. The equipment used in the investigation was of the type normally found in

schools. The researcher was never in the classes during the study and the investigation was conducted during the third and fourth week of school to counteract the formation of any harmful patterns of social arrangements that might be present later in the year. In the main, the students never knew they were being studied. They were told to listen carefully, to enjoy the story, and to remember as much of it as possible. They were told a test would follow the story.

Procedure

The listening comprehension test was administered in the spring 1983 at the end of the students' year in third grade. The reading rate test was administered on the last school day before the first stimulus passage was presented.

The experimentation part of the study began with the introduction of the stimulus passages presented to each group at the appropriate rate. The rates were normal (175 words per minute), one-half normal (87.5 words per minute), one and one-half times normal (262.5 words per minute), and two times normal (350 words per minute).

Seven passages of stimulus material were presented. The passages, taken from the New Reading Skill Builder by Reader's Digest, prepared for fourth-grade children, were read by an experienced narrator who was able to read consistently at the 175 words-per-minute rate required for the study. The passages ranged in length from 1102 to 1506 words and as the titles indicate, they were of general interest for the age level. In order of their presentation, the stories were "Snowshoe Thompson",

"The King's Goldfish", "Burglar in the Treetops", "Story of Moby Doll", "What Every Young Cat Oughta Know", "Hurricane!", and "Cider, My Setter". To select the stories for the study, a pile of sixteen pieces of paper with a different title on each were formed. A person not associated with the study in any way drew seven titles from the pile. The order in which the seven were drawn signified not only their selection but also the order in which they were presented. The stories were recorded in the studio of the Audiovisual Center at Oklahoma State University. The compression rates were accomplished by using the Lexicon recorder which was especially designed for this purpose.

After the first presentation and each thereafter, a twenty-item multiple-choice examination was administered either orally or visually (written) to the appropriate subjects. Ten items on the examination were prepared by Reader's Digest. In order to expand the test to make it more sensitive, an elementary teacher with fifteen years of experience in grades two through six and not associated with the study prepared an additional ten items for each test. In performing split-halves reliability measures, there were no differences in "teacher-made" items when compared to those produced by Reader's Digest. A reliability coefficient of .79 was achieved.

The students who were selected for the oral administration listened to the test via tape recorder and head sets. The tests were recorded by the same person who read the stimulus passages. Students selected for the written method of test administration remained at their seats and responded to the same twenty-item multiple-choice instrument. After the fourth administration, the groups were reconstituted and then randomly assigned to new test administration conditions by using the same

computer program for random assignment. In this way, any differences tend to represent differences in methods of test administration rather than any possible sampling bias. In a sense, this step produced a second study which tended to serve as a device for the replication of results. If findings hold for both sessions, in general, it should be reasonable to assume that the results are not tentative. In Chapter 4, results will show both sessions and they will be referred to as halves.

Following the administration of the comprehension examination, the answer sheets were collected by the homeroom teachers and normal classroom activities continued. The same procedure was followed for each of the seven days of the study. In order to avoid possible intervening or confounding variables, the researcher did not administer any test or even enter any of the classrooms during the period of the investigation.

All equipment used was of the variety often found in the typical public school classroom. Since the intent of the study was to test the appropriateness of compressed speech in non-laboratory conditions, no special speakers, cassette recorders (other than the Lexicon), or headsets were used. All speakers used for the classroom broadcast of the stimulus passage were of the type found with 16mm motion picture projectors but they were equal in output. The cassette players were Wolensak 2505 playback machines. The headsets used for the listening tests were all telex model 610.

Data Analysis

In order to test the hypotheses of this study, a two by two by two

by four Multivariate Analysis of Variance (MANOVA) with repeated measures on time was used to examine the interaction of the independent variables (sex, method of test administration, presentation rate, and time) on the dependent variable (comprehension scores). An .05 level of significance was determined as the standard by which the hypotheses would be accepted or rejected.

Multiple comparisons tests were performed and strength of associations were used.

CHAPTER IV

RESULTS OF THE STUDY

Introduction

The results of this study investigating the ability of fourth-grade students to comprehend compressed speech is presented in this chapter. The major hypothesis upon which this study was based was demonstrated: Fourth-grade students can gain information from material presented at compressed rates.

To test the major hypothesis and the eight particular hyphotheses, seventy-nine students in four fourth-grade classes in Perry, Oklahoma were given messages at four different rates. In all, seven messages were presented with comprehension measures following each presentation. The study was conducted in classrooms in an effort to test the overall theories regarding compressed speech in typical educational environments.

Statistical Analysis

In order to test the hypotheses, a two by two by two by four Multivariate Analysis of Variance (MANOVA) with repeated measures was used. The data was statistically treated by a new software package entitled SSPS X by the University Computer Center at Oklahoma State University. In order to accept or reject the null form of these hypotheses, the .05 level of significance was used.

Tables I and II displays the "Tests of Significance for Grandmean using Sequential Sums of Squares" and "Averaged Tests of Significance for Test using Sequential Sums of Squares" for both Days one to four and Days five to seven. Statements of the hypotheses and the results follow:

Hypothesis 1. Rate of presentation will have no significant effect on the comprehension scores of the elementary students.

In the first half of the study, the hypothesis must be rejected. There is a significant difference in the effects of rate on comprehension scores. For the second half, the differences are pronounced but not to the point judged to be significant. In general, for both halves, the slower the speed, the better the students performed. Figure 1 plots the progression of scores from Day one to Day seven. Overall, the normal and 1/2 expanded rates follow closely from day to day. The accelerated rates fall below the slower presentations consistently. Table III compares the changes by rate. Both the normal and twice normal rates actually decreased on Day seven compared to Day one. The greatest gains in mean score occurred at the one and one-half rate; the

TABLE I

TESTS OF SIGNIFICANCE FOR GRANDMEAN
USING SEQUENTIAL SUMS
OF SQUARES DAYS
1 TO 4

Source of Variation	Sum of Squares	DF	Mean Square	F
Sex (A)	1.25619	1	1.25719	.04878
Test Method (B)	39.49781	1	39.49781	1.53264
Rate (C)	2045.48466	3	681.82822	26.45704*
A x B	110.71684	1	110.71684	4.29616*
A x C	27.19894	3	9.06631	.35180
B x C	53.52559	3	17.84186	.69232
A x B x C	9.64447	3	3.21491	.12475
Within Cells	1468.95506	57	25.77114	

*=P>.05

AVERAGED TESTS OF SIGNIFICANCE FOR TEST
USING SEQUENTIAL SUMS
OF SQUARES DAYS
1 TO 4

Source of Variation	Sum of Squares	DF	Mean Square	F
Test (D)	138.80479	3	46.26826	11.03482*
A x D	14.30267	3	4.76756	1.13705
B x D	2.80997	3	.93666	.22339
C x D	84.68976	9	9.40997	2.24425*
A x B x D	5.45039	3	1.81680	.43330
A x C x D	27.43376	9	3.04820	.72698
B x C x D	55.42498	9	6.15833	1.46874
A x B x C x D	238.34230	9	15.37137	3.66602*
Within Cells	716.99137	171	4.19293	

*=P>.05

TABLE II

TESTS OF SIGNIFICANCE FOR GRANDMEAN
USING SEQUENTIAL SUMS
OF SQUARES DAYS
5 TO 7

Source of Variation	Sum of Squares	DF	Mean Square	F
Sex (A)	5.87237	1	5.87237	.27755
Test Method (B)	104.36748	1	104.36748	4.93285*
Rate (C)	1434.26338	3	478.08779	22.59644*
A x B	34.50430	1	34.50430	1.63082
A x C	164.74782	3	54.91594	2.59556
B x C	280.63888	3	93.54629	4.42139*
A x B x C	82.70148	3	27.56716	1.30294
Within Cells	1100.19841	52	21.15766	

*=P>.05

AVERAGED TESTS OF SIGNIFICANCE FOR TEST
USING SEQUENTIAL SUMS
OF SQUARES DAYS
5 to 7

Source of Variation	Sum of Squares	DF	Mean Square	F
Test (D)	53.68627	2	26.84314	4.67528*
A x D	1.73017	2	.86509	.15067
B x D	8.67435	2	4.33717	.75541
C x D	57.98898	6	9.66843	1.68333
A x B x D	1.82076	2	.91038	.15856
A x C x D	31.52985	6	5.25498	.91526
B x C x D	39.53756	6	6.58959	1.14771
A x B x C x D	25.24951	6	4.20825	.73295
Within Cells	597.11587	104	5.74150	

*=P>.05

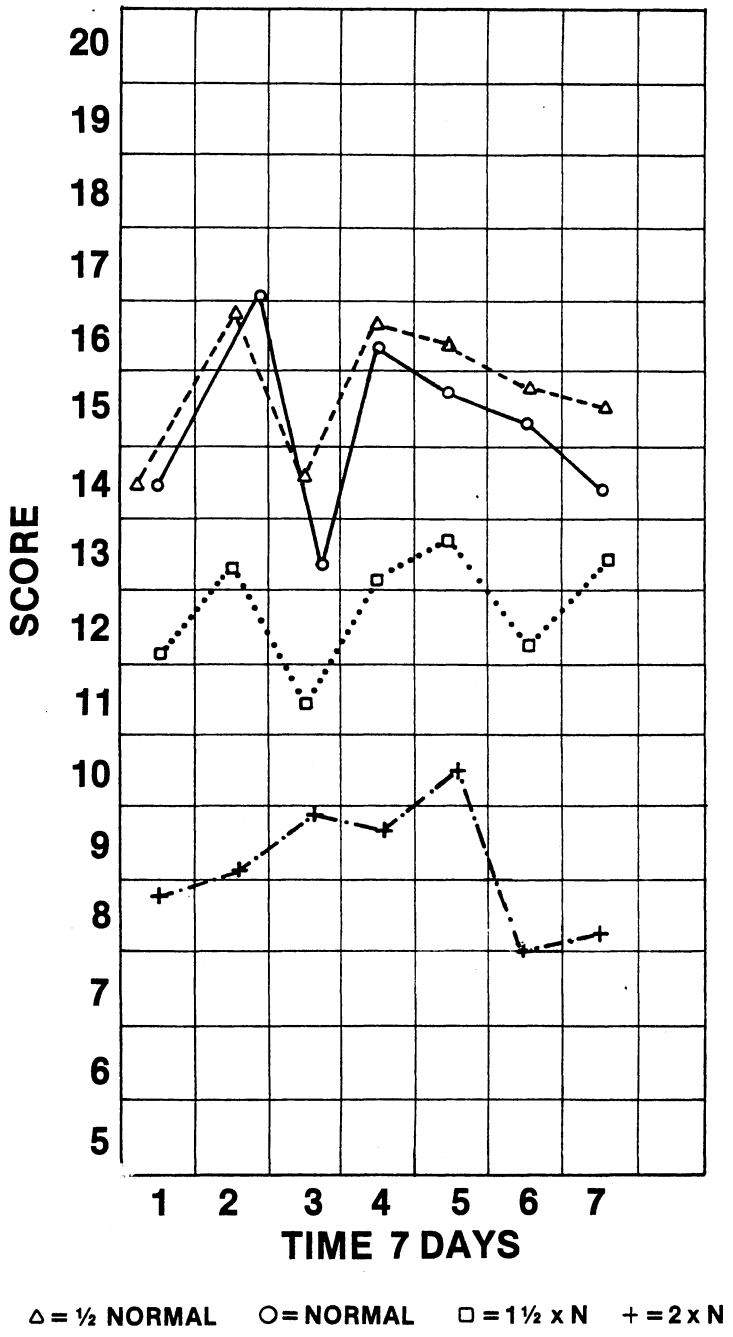

Figure 1. Rate by Time

TABLE III

CHANGE COMPARISONS BY RATE

Test	DF	Mean	SD	STD. Error	Difference Mean
One-half Normal Rate==87.5 WPM					
7	17	15.6111	3.292	0.776	1.2222
1		14.3889	3.183	0.750	
Normal Rate==175 WPM					
7	18	14.1579	4.463	1.024	-0.3158
1		14.4737	3.169	0.727	
One and One Half Times Normal Rate==263 WPM					
7	18	13.5789	4.114	0.944	1.3158
1		12.2632	3.142	0.721	
Twice Normal Rate==350 WPM					
7	15	7.8750	2.705	0.676	-1.1250
1		9.0000	2.556	0.639	

gain was almost one and one-half points. However, even with this growth the accelerated rates remained below the slower presentations.

Hypothesis 2. Comprehension scores will not be affected by sex and when scores are compared, the girls' and the boys' will not differ significantly.

For both halves of the study, this hypothesis must be accepted. At the slower rates, the female students tended to do better than their male counterparts. At the two speeded rates of presentation, the boys did better. The second half of the study the difference came closer to significance but not enough to be reported with confidence. Figure 2, The Effects of Sex by Rate by Time, presents the data in graph form. The third rate (262.5 wpm) displays an overwhelming difference in favor of the boys. However, for the other rates, the differences are not so pronounced. The closeness to significance for this hypothesis is due to the marked difference in the third rate.

Hypothesis 3. There will be no significant increase in comprehension scores as a result of practice.

Figure 1 shows that for all rates, there is a significant quadratic pattern. For each test or group of tests when comprehension scores were up, scores on succeeding tests would be down. The "practice" hypothesis must be accepted. The students did not progressively improve with each session or treatment.

Hypothesis 4. There will be no leveling off effect in comprehension scores before the seventh and final presentation of compressed material.

It was anticipated that if Hypothesis 3 proved incorrect and that a linear relationship rather than a quadratic occurred, the scores would

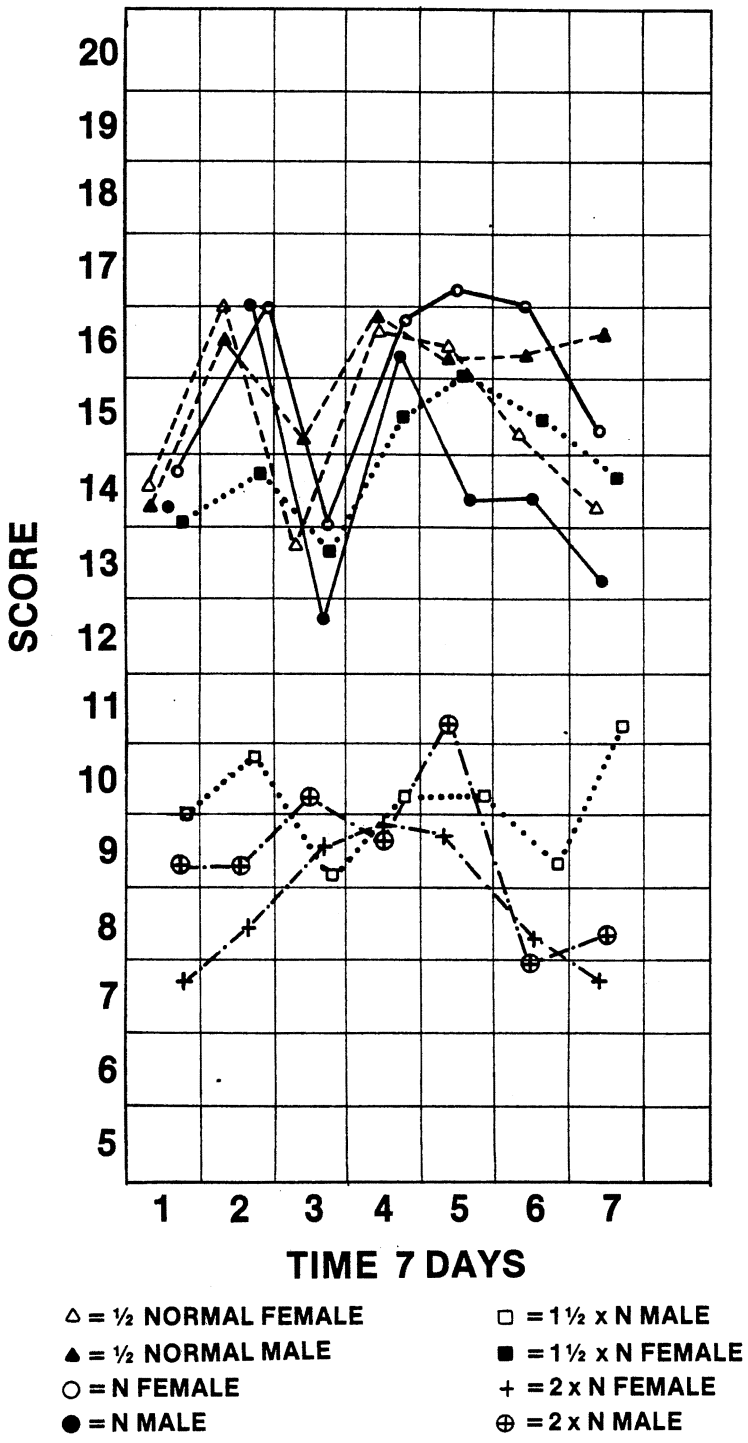

Figure 2. The Effects of Sex by Rate by Time

generally improve until a peak was reached. The significance of the quadratic pattern forced the acceptance of this hypothesis.

Hypothesis 5. There will be no correlation between reading rate and listening rate.

The students' reading rates as measured by the NELSON READING SKILLS TEST in no way correlated to their comprehension scores. Accordingly, the hypothesis must be accepted. Interestingly, while reading rate showed no correlation, the reading and listening comprehension scores of the STANFORD ACHIEVEMENT PRIMARY LEVEL III did show positive correlation with the comprehension scores. Table IV displays the various correlations of standardized comprehension scores with the scores obtained by the rate tests. So while there is no correlation between reading rate and listening rate, there is a correlation between comprehension scores of listening and reading.

Hypothesis 6. There will be no difference in the efficiency measures of rates used.

The efficiency index as measured by the LEI was used in an attempt to describe amounts of information gained within a certain span of time. It was used primarily to show that while students might not gain as much during high rates of presentation as they did at slower rates, they did save time at the accelerated rates. However, as Table V reveals, the hypothesis must be rejected but not for the reasons that were predicted to force a rejection at the beginning of the study.

At the rate of 350 words per minute, the students recorded an efficiency index of -20.33. At 262.5, an index of -5.7 was realized. The normal rate with an index of 1 was even better than the +.25 for the 87.5 words per minute rate.

TABLE IV

TESTING METHOD BY RATE CORRELATED WITH THE STANFORD TEST FOR READING AND LISTENING COMPREHENSION

Rate	Reading Comprehension Correlation with Written Test	Listening Comprehension Correlation with Listening Test
1/2 N	+.15	+.39*
N	+.63*	+.02
1 1/2 x N	+.19	+.17
2 x N	+.17	+.42*

*=p>.05

TABLE V

LEARNING EFFICIENCY INDEX

Compression Rate	Mean	Playback Time	WPM	LEI
2xN	9.2	30"	350	-20.33
1 1/2xN	12.7	45"	263	-5.7
N	15.3	1'	175	+1.0
1/2N	15.8	2'	87.5	+.25

Hypothesis 7. There will be no significant differences in comprehension scores as a result of the two methods of test administration.

During the first half of the study, at the slower rates, the students taking written examination tended to out perform those listening to the test items. However, the findings for the first half were not significant. For the second half of the study, the method of administering the comprehension examinations had a significant effect. At the 87.5 words per minute rate, the pattern held as those taking the written examination continued to do better. At the normal rate and the two higher rates of presentation, those listening to the tests did better. Figure 3 presents the effects of the two testing methods at the four rates of presentation.

Although as reported, in the first half, method of testing was not significant, the sex of the student and the test method tended to have a significant effect on comprehension scores. The boys who took written exams performed better than the boys who listened to the same tests. For the girls, those who listened tended to do better. Figures 4 through 7 show the comparisons of testing methods by sex for each rate.

In all, Hypothesis 7 must be rejected since some form of significance was found in both halves.

Hypothesis 8. There will be no interaction effects of rate of presentation, sex, test administration, and time.

For reasons alluded to previously, Hypothesis 8 must be rejected, at least, for the first half of the study. There was a significant interaction as the four independent variables combined to have some effect on the dependent variable. As reported earlier, sex and test method tended

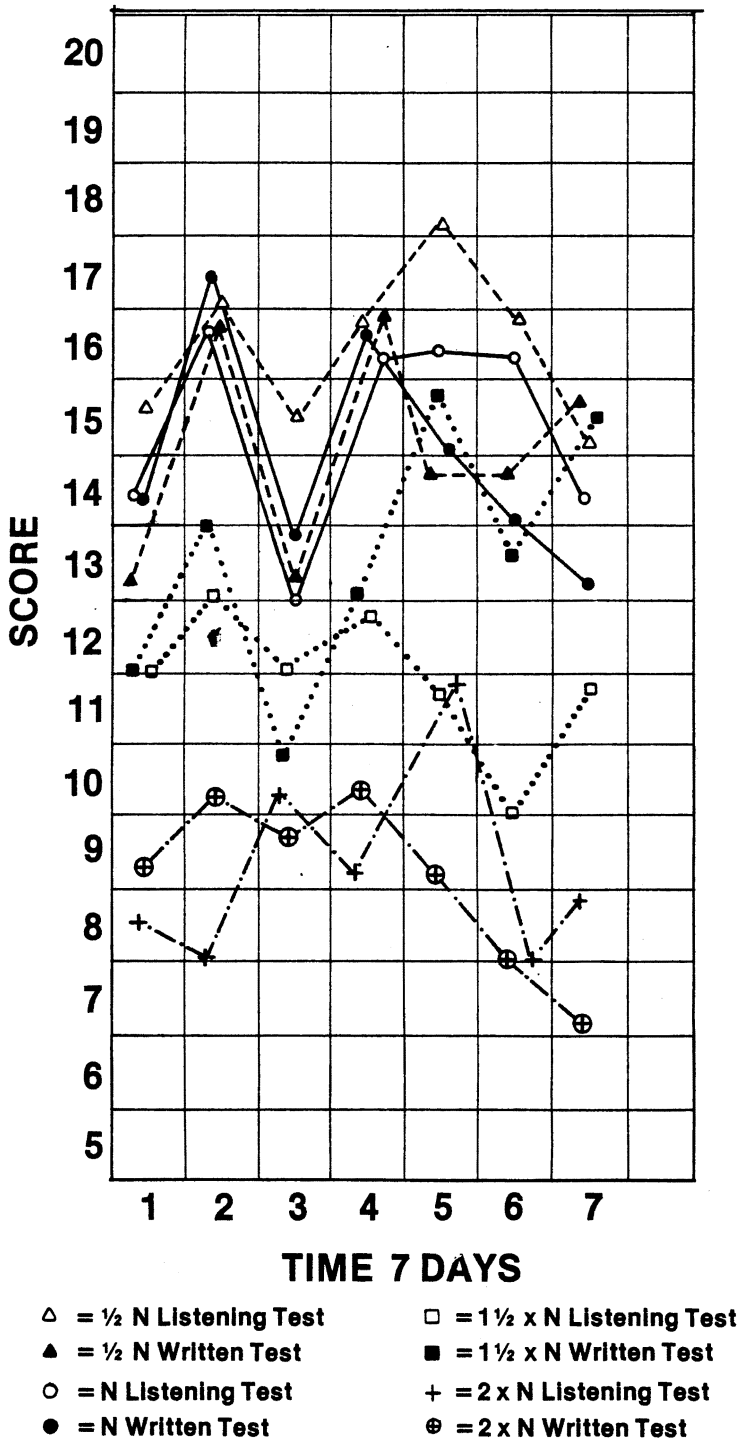

Figure 3. The Effects of Testing Method by Rate by Time

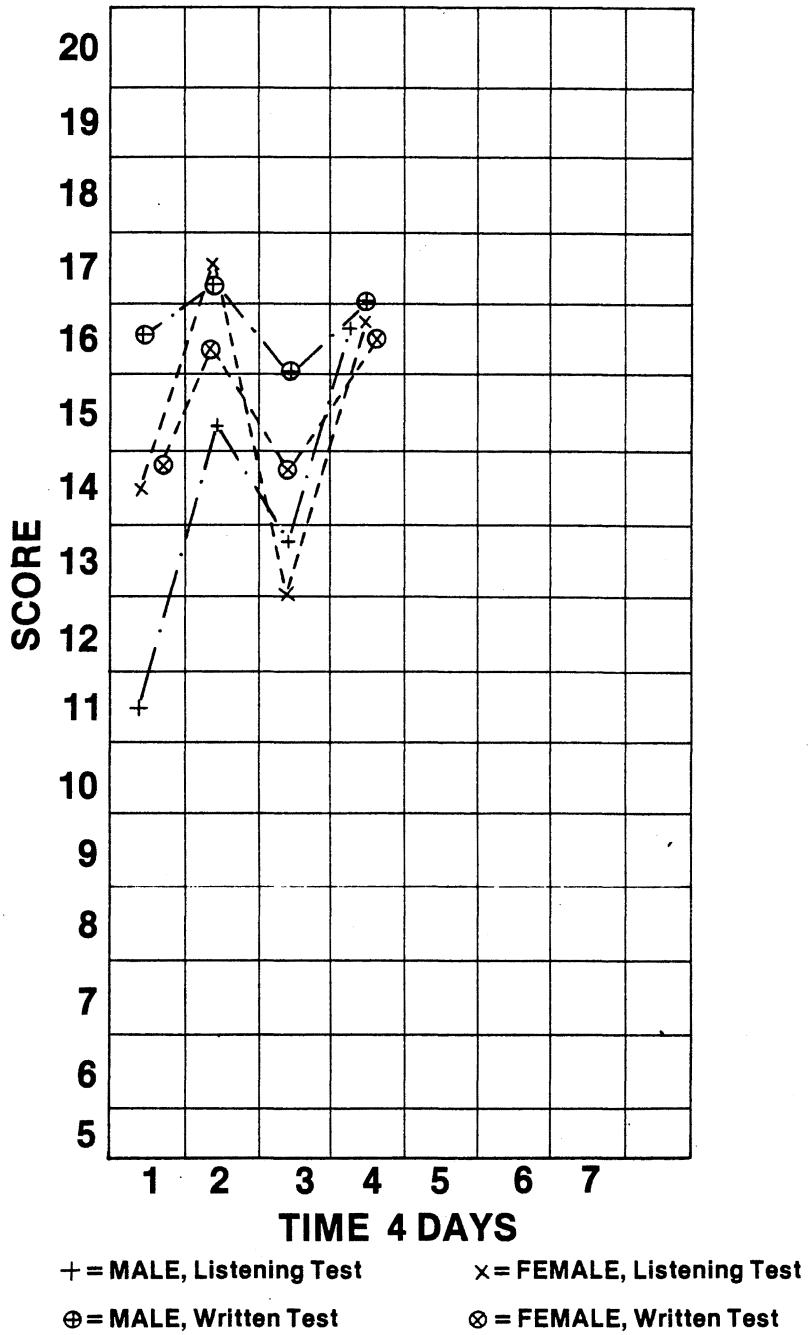

Figure 4. The Effects of Sex by Testing Method by Rate 1 by Time

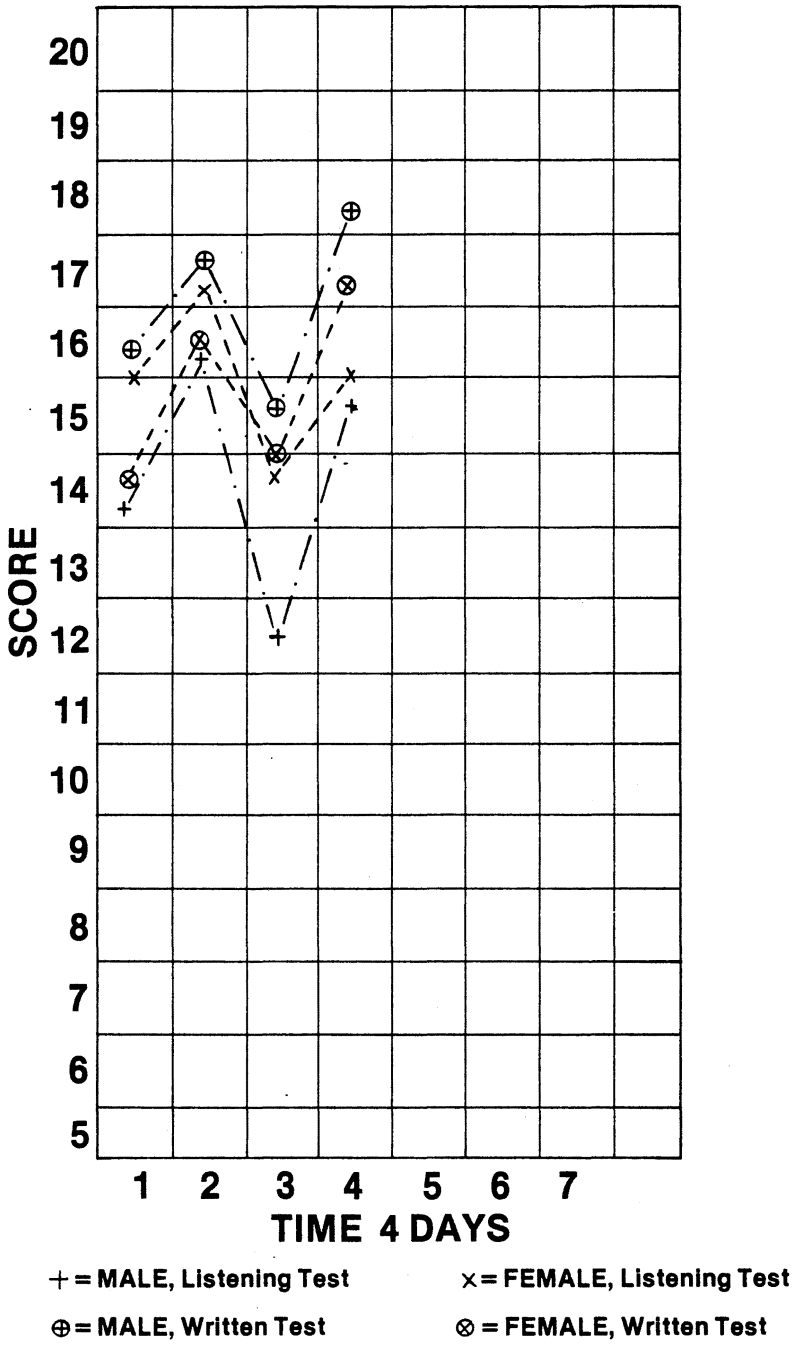

Figure 5. The Effects of Sex by Testing Method by Rate 2 by Time

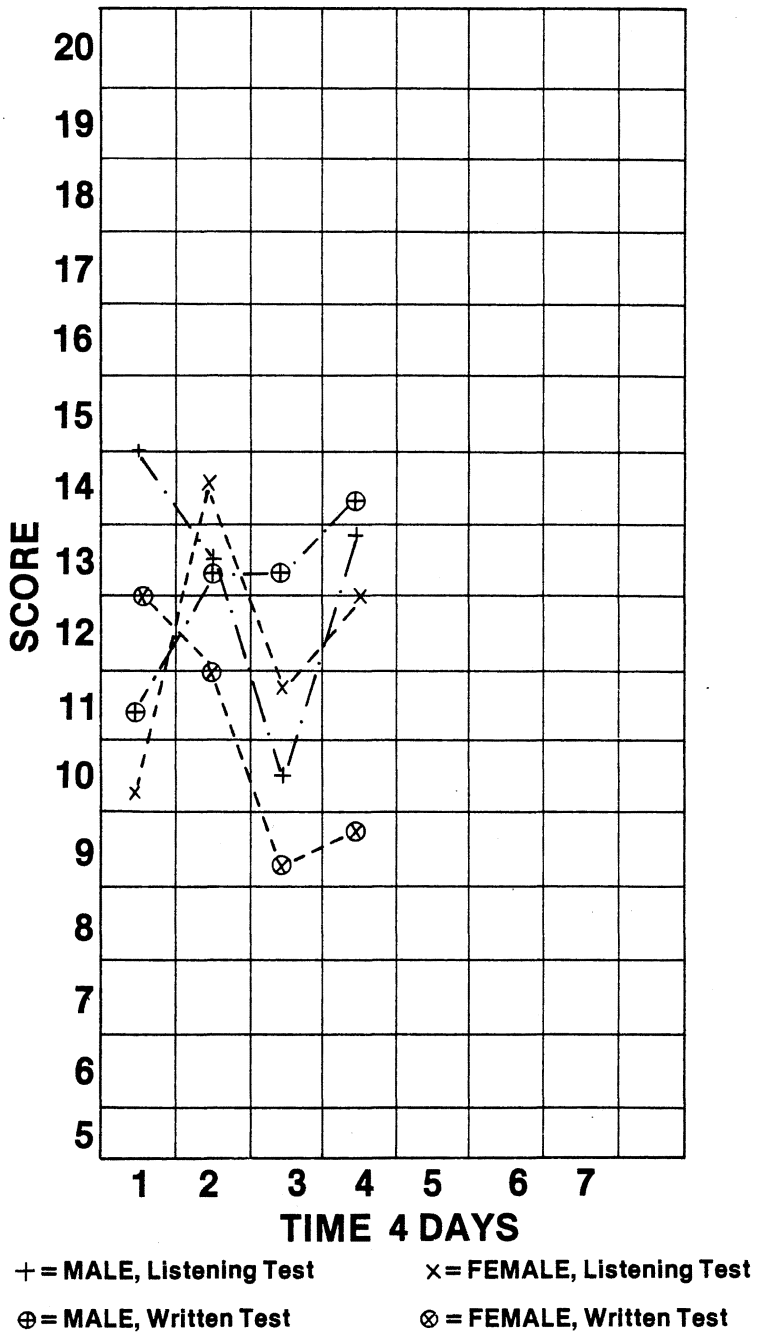

Figure 6. The Effects of Sex by Testing Method by Rate 3 by Time

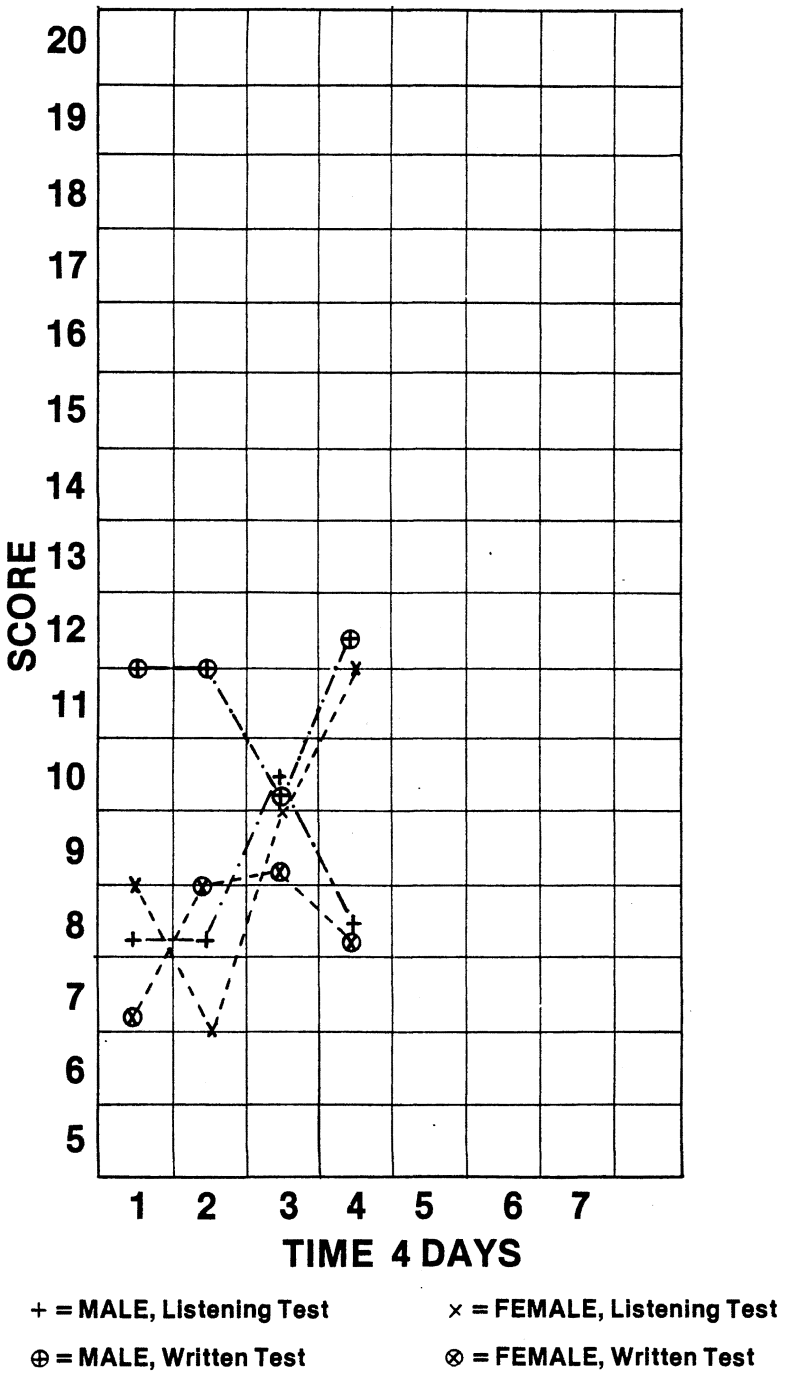

Figure 7. The Effects of Sex by Testing Method by Rate 4 by Time

to have effects as did rate and sex. A test method by rate interaction was significant in the second half and exerted some influence in the first. The interaction did not occur significantly in the second half.

CHAPTER V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Summary

The basis of this study was the theory concerning the rapidity with which the normal human can process information. Particularly, the study dealt with elementary children (fourth-grade students) and their ability to process information at four rates of presentation. A premise upon which the investigation was based stated that elementary students could comprehend materials presented at greatly accelerated rates. An important part of the study involved the use of compressed speech in actual classroom environments.

In addition to the major premise for the study, eight other hypotheses were tested on seventy-nine fourth-grade students at Perry, Oklahoma in the fall of 1983. The students were randomly assigned to treatment conditions and all measures of the study were conducted in their own classroom by their homeroom teacher. Four rates of presentation were used during the seven-day study. Normal speed for the control class was 175 words per minute. An experienced narrator was able to maintain the pace in all seven stories that were recorded for

the investigation. A "time-expanded" version of 87.5 words per minute was played for one class while 252.5 was used for a third class. The fourth class was assigned a two times normal rate of 350 words per minute.

Each class heard only the rate assigned to it. The stories taken from the Reader's Digest Skill Builders were designed for fourth grade students and were played in each class at the same time each day of the study.

At the conclusion of each story averaging eleven hundred words in length, a twenty-item multiple choice examination was administered to test for comprehension. Since some question had been raised in the literature regarding the appropriate method of testing for listening comprehension, and since many studies had used only written multiple-choice tests requiring the students to read the stimulus items, two test administration methods were used. One half of each class took a traditional "written" examination while one half heard the stimulus items via headsets. The "verbal" tests were the same as the written ones. The narrator who had read all the stimulus passages also produced the verbal tests.

Conclusions

The major conclusion of the study is in accord with the basic premise for the study. Fourth-grade students can gain information via compressed rates of presentation. However, questions concerning the quality of the accelerated mode of communication must be asked.

Clearly, the faster rates failed to meet the anticipated amounts of success that earlier studies (pre-1975) had demonstrated.

As for the utility of compressed speech in the typical classroom environment, had the comprehension scores been higher, the study would have definitely demonstrated favorably for accelerated presentations. Equipment that is found in most all elementary schools was used to present the material. There was no intelligibility problem or any other mechanical malfunction.

For the stated eight hypotheses, the conclusions follow:

Conclusion 1. Rate of presentation did have a significant effect on the comprehension scores of the elementary students.

Significance was reported for the first half of the study and for the second, had the one and one-half times normal rate (252.5 wpm) not made some gains in mean scores, the significance would have held for both halves of the study. As it was, the major pattern established in the first half of the slower the speed the better the performance continued.

Conclusion 2. Comprehension scores were not significantly affected by sex and when scores were compared, the girls' and the boys' did not differ significantly.

In the face of strong evidence to the contrary, the hypothesis must be accepted. The results indicate that the boys tend to do better with faster rates while girls do better than the boys with slower rates. This finding, if significant, would be consistent with previous studies. However, for this investigation, no such definite statement can be made with confidence.

Conclusion 3. There was no significant increase in comprehension

scores as a result of practice.

It was anticipated that a strong linear pattern would develop with the scores continuing to increase each successive day of the study. No pattern was found. A significant quadratic pattern was revealed. At two of the rates (one-half normal and one and one-half times normal) the last day's mean scores were better than the first day's scores. The other two rates actually showed a decrease. If training does occur for the accelerated rates, it may be most useful around the 250 word per minute range. Hypothesis 3 must be accepted.

Conclusion 4. There was no leveling off effect in comprehension scores before the seventh and final presentation of compressed material.

The confidence in the value of practice was expressed in hypothesis 4. It was believed that as the scores continued to increase with time and "practice", the students would eventually reach a peak. At that point, the scores would stay consistent. Obviously, since practice was found to have no effect, a leveling off was never evidenced either. The quadratic or non-linear pattern tends to suggest a general up and down pattern of scores regardless of the length of time involved in the study.

Conclusion 5. There was no correlation between reading rate and listening rate.

It was believed that the students reading at a more rapid rate than their classmates would "catch on" and score more highly more quickly at the accelerated rates. The reading scores as measured by the NELSON READING SKILL TEST showed no correlation at all with the listening scores.

Perhaps it is appropriate that no correlation was found between

listening rate and reading rate. As students learn to read more rapidly, as a rule, they learn to "see" more words with each fixation while their eyes remain still for shorter periods. With accelerated listening, essentially there is no grouping of words possible which means the two activities are dissimilar. In the listening situation, words still come strung together in a definite sequence and an increase in rate merely means the string is delivered faster. At the moment, it is not possible to "hear" a whole sentence at once while it is possible to read a whole sentence with one fixation.

Conclusion 6. There were differences in the efficiency measures of the rates used.

As expected, the hypothesis must be rejected. As reported, there is a definite difference in efficiency measures. However, before the investigation, it was believed the efficiency rating would be in favor of the accelerated rates. It is not. The normal rate proved to be the most efficient.

Conclusion 7. There were significant differences in comprehension scores as a result of the two methods of test administration.

The hypothesis must be rejected. In general, the faster the rate the better the listening method of testing. It could be that the written method of testing comprehension introduces vocabulary and word recognition dimensions that are not experienced at the more normal slower rates. At the faster rates, meaning is obtained from bits and pieces of information in a way that is subtle yet highly complex. When students listening at the higher rates suddenly are confronted by long or strange words on a test, the reality of the examination may extinguish any meanings they had obtained through the inferences they

had made by piecing information together. At the slower rates, problems of this sort did not materialize because no information had to be obtained through inference.

Conclusion 8. There were interaction effects of rate of presentation, sex, test administration, and time.

For the first half of the study, the hypothesis must be rejected. However, it was not replicated in the second half. The interaction occurred because rate made a difference; sex made some difference; testing method made a difference; and time had an effect since the quadratic pattern was prevalent.

Sex and testing method interacted siignificantly. The boys taking the written examinations scored higher than the boys taking the listening tests. For the girls, those taking the listening tests tended to score higher. Rate and sex interacted to produce some effects on the scores. The boys tended to do better at the faster rates. The girls tended to out-perform the boys at the slower rates.

The interaction of these variables may also present a more subtle pattern that has been evident in much of the research preceding this investigation. There are many conflicting patterns confronting the reviewer of compressed speech. In the early going, investigators reported much success with high rates of presentations. Late research as well as this study has tended to show otherwise. Early on, there appeared to be a difference in comprehension of accelerated rates because of the sex of the student. Later, this finding was refuted. Still later, there appears to be cause for looking at sex again. Method of testing for comprehension appears to make a difference. Evidence is beginning to support prediction. But the predictions cannot be made

consistently with confidence. The present study appears to be but a microcosm and tends to mirror the larger body of research which has been conducted. The support for this assertion comes from the significance found in the interaction of the four variables during the first half of the study. The significance could not be replicated in the second half. In point of fact, there still appears to be another variable or set of variables which at times cancels certain effects while at other times, it or they augment those same effects.

Recommendations

From a study with results not as anticipated, many questions arise. There is a question as to why so much early evidence demonstrating the ability of students (and adults) to gain information successfully from rates in excess of 400 words per minute are not now being duplicated? What has changed or what is there about society now that precludes the same successes at such high rates of presentation? Is it possible that the present study was not long enough to find all the definite patterns hypothesized? What does listening involve internally that causes the activity to be as different from reading as the findings of this study tend to suggest? Is it possible to treat a potential communication tool (compressed speech) as an end and find significance? In other words, could studying the effects of compressed speech in the midst of normal-rates of delivery pre-determine the outcome of the investigation?

Based on the questions outlined, the following recommendations are put forth:

Recommendation 1. Obviously, more research should be conducted in the classroom. To find the answers necessary to make compressed speech a viable communication tool, the curriculum of the school could be enhanced. If the future holds more science and math for students at the expense of the humanities, perhaps, such forgotten courses of study could be "compressed" in between the "basics".

Recommendation 2. Investigate societal trends which might give a clue as to why 1968, for example, differs from 1983 in the history of compressed speech. As the literature revealed, the more recent the study, the slower the successful rates. Might it be said that as the effects of media on society continues to be exerted in many new ways, society is becoming numbed to reality which impairs the process of gaining meaning from listening?

Recommendation 3. Investigate the possibilities of combining rates of presentation. In other words, would it be appropriate to lead off the key sentences of paragraphs at a slower than normal rate and then gradually increase the rate until the end of the paragraph is reached. One of the problems with the extremely fast rates of presentations is the fact that students are well into the message before they may be ready to "hear" it.

Recommendation 4. Study the rates in situations of the students' choosing. For example, most studies [if not all] have committed the worst possible sin as far as media presentations are concerned. With the exception of assuring the appropriateness of the content, the audience is rarely considered. For any message to be truly communicated successfully, the audience should be allowed to "push" the rate as they desire. Instead of having something done <u>to</u> them, they ought to have a

chance to participate with the study.

Recommendation 5. Replicate this study and run it for a longer period of time. In the studies dealing with practice, ancillary activities often were not reported. Clearly, in some studies, the subjects were concerned only with compressed speech. In busy classroom environments, many activities call for the attention of the students. Most probably, the more sessions with compressed speech within each day of a study, the more accelerated rates will be seen as a tool and not merely a singular oddity occurring in an already excessively busy class period.

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APPENDIXES

APPENDIX A

MULTIPLE-CHOICE EXAMINATIONS FOR THE WRITTEN TESTING METHOD

Snowshoe Thomson

Name _____

Please circle the letter with the best answer.

Example: Snowshoe Thomson made (a) skis, (b) shoes, (c) oars.

In the example, you would circle the (a) to show skis as the best answer.

Begin the test.

1. Snowshoe Thomson made skis out of oak boards because he wanted to (a) carry mail over the mountains, (b) be the first to cross the mountains, (c) enjoy skiing in the mountains.

2. Snowshoe Thomson carried no gun because he (a) knew he would not need it, (b) wanted to lighten his load, (c) was afraid of guns.

3. Snowshoe Thomson watched the drifts of snow, the flow of streams and the track of animals because (a) he loved the snow, streams and animals, (b) his father had taught him to do it, (c) it helped him find his direction.

4. Snowshoe sometimes built a fire near a learning dead tree because the noise of the falling tree (a) scared wolves away, (b) brought help, (c) awakened him.

5. Snowshoe Thomson went to Washington because he (a) was hunting a job, (b) wanted his back pay, (c) wanted to see Washington.

6. John Thomson was born in (a) California, (b) Norway, (c) Iceland.

7. Snowshoe first learned about the mail carrier's job from (a) a friend, (b) the postmaster, (c) a newspaper.

8. Most of the stories of Snowshoe's deeds were based on (a) facts, (b) lies, (c) tall tales.

9. Snowshoe carried the mail for (a) one winter only, (b) two winters only, (c) many winters.

10. For his work as mail carrier, the government paid Snowshoe (a) $750, (b) $6000, (c) nothing.

11. John Thomson learned to ski in (a) Norway, (b) Illinois, (c) Washington.

12. The skis he made weighed about (a) 2 pounds, (b) 25 pounds, (c) 50 pounds.

13. To eat, while on the mail run, Thomson carried (a) instant soup, (b) dry biscuits and meat, (c) beans and coffee.

14. On his trips, Thomson slept (a)in settler's cabins, (b) at an inn, (c) out in the wilderness.

15. On day Thomson had a close call with (a) a grizzly bear, (b) timber wolves, (c) mountain lions.

16. John Thomson's nickname was (a) Snowshoe, (b) Mail call, (c) Snowman.

17. Thomson once saved a man (a) who had run out of food, (b) was lost in a storm, (c) whose feet were frozen.

18. When a stage line began carrying the mail, Thomson (a) continued to carry the mail in the winter, (b) retired, (c) drove one of the stage coaches.

19. Carved on Thomson's tombstone is (a) mail bag, (b) a flaming tree, (c) a pair of crossed skis.

20. Tohn Thomson was a pioneer of (a) mail carrying, (b) skiing, (c) gold mining.

The King's Goldfish

Name _____

Please circle the letter with the best answer.

Example: The boy's family was in (a) Hawaii, (b) Pittsburgh, (c) Perry.

In the example, you would circle the (a) to show Hawaii as the best answer.

Begin the test

1. The boy's family was in Hawaii so that the father could (a) meet the king, (b) teach school, (c) paint a picture.

2. The boy was not happy because children said his parents were (a) rich, (b) poor, (c) mean.

3. Tubs at every driveway were filled with (a) fresh flowers, (b) water, (c) sand.

4. When the boy got on the mule-car he thought, (a) "I can ride back with my fish." (b) "How am I going to get back?" (c) "I will be punished for this."

5. The boy caught the King's goldfish with (a) his hands, (b) a bent pin, (c) a worm.

6. The boy was almost run over by the King's (a) automobile, (b) mule-car, (c) carriage.

7. When the boy showed him the goldfish, the King ordered his soldiers to (a) take it away from him, (b) get a pan full of water, (c) make the boy walk home.

8. Reaching home, the boy was awakened by shouts of (a) laughter, (b) anger, (c) fear.

9. Rich people's tubs had (a) water lilies in them, (b) goldfish in them (c) colored water in them.

10. The King's new fish had come from (a) Japan, (b) New York, (c) Alaska.

11. From his tin bank, the boy took (a) a dollar, (b) fifty cents, (c) ten cents.

12. He spent 5 cents on a (a) fish hook, (b) ball of string, (c) fish bowl.

13. The sign on the gate said that anyone caught fishing would (a) be punished, (b) be shot, (c) have their head cut off.

14. The fish from Japan were special because they (a) were striped with gold, (b) had feather fins and long tails, (c) were 8 inches long.

15. The boy had to run home because (a) the mule-car was gone, (b) he was afraid to ride the mule-car, (c) he had no money for the mule-car.

16. To keep the fish alive, the boy stopped often to (a) wet him in a ditch by the road, (b) wrape it with wet leaves, (c) ask at a house for a glass of water.

17. When the King saw who the boy was he (a) ordered him to jail, (b) laughed and went on, (c) invited him into the carriage.

18. Because he was so scared, the boy (a) burst into tears, (b) turned pale, (c) got goosebumps.

19. When the fish was put in the pan of water, it (a) died, (b) swam happily, (c) went to the bottom.

20. The next day a letter from the King told the boy (a) to pay for the fish, (b) to stay away from the King's pond, (c) he had the right to fish in the King's Park.

Burglar in the Treetops

Name _____

Please circle the letter with the best answer.

Example: The raccoon was (a) nervous, (b) calm, (c) lethargic.

In the example, you would have circled the (a) to show nervous as the best answer.

Begin the test.

1. The raccoon is nervous because he (a) is hunted so often, (b) eats too much, (c) is awake all night.

2. The raccoon is hunted mainly for his (a) meat, (b) fur, (c) value as a pet.

3. The raccoon makes up for being slow by having (a) skillful paws, (b) warm, thick fur, (c) a desire to work.

4. The raccoon spends most of his time (a) eating and sleeping, (b) building his home, (c) fighting dogs.

5. Cooney washes his food because (a) he is a very clean animal, (b) dirty food makes him sick, (c) he has not aliva.

6. A raccoon's head is shaped like a (a) fox, (b) bear, (c) cat.

7. A raccoon is related to a (a) dog, (b) bear, (c) possum.

8. One raccoon broke into a camp and (a) opened jars of honey to eat, (b) ate one dozen eggs, (c) turned the picnic basket over.

9. The raccoon lives all over (a) the world, (b) South America, (c) North America.

10. A Raccoon moves about and eats mostly (a) during early morning, (b) at night, (c) during the late afternoon.

11. The raccoon lives near (a) dry desert areas, (b) large cities, (c) woods and streams.

12. The raccoon usually likes to live in (a) hollow trees(b) deserted beaver dams, (c) abandoned cabins.

13. How many babies does a raccoon have? (a) 1 to 2, (b) 3 to 6, (c) 12 or more.

14. Farmers don't like raccoons because they steal his (a) wheat, (b) cotton, (c) corn.

15. One food that raccoons can eat without washing is (a) fruit, (b) dog biscuits, (c) grain.

16. Father coons stay around their young (a) in case an enemy happens along, (b) so they can catch frogs for him, (c) because they are too lazy to go anywhere else.

17. A raccoon once fooled a hound by (a) jumping across thin ice, (b) rolling across thin ice, (c) swimming faster than the dog.

18. Cooney saves gamefish by (a) eating frogs, (b) eating clams (c) eating turtle eggs.

19. In the winter, raccoons, in the north, (a) migrate, (b) hibernate, (c) do not hibernate, (d) do not migrate.

20. In a battle with an enemy, a raccoon will (a) play dead, (b) show courage, (c) spray a bad scent.

Story of Moby Doll

Name _____

Please circle the letter with the best answer.

Example: Sam decided not to (a) kill, (b) pet, (c) feed a whale.

In the example, you would circle the (a) to show kill as the best answer.

Begin the test.

1. Why did Sam decide not to kill the whale? (a) it was only half alive, (b) it looked him in the eye, (c) It had a baby.

2. Why did Sam's news excite Dr. Newman? (a) he wanted a dead whale to study, (b) he had never seen a killer whale, (c) only one other killer whale had been taken alive.

3. How did Sam get the whale back to Vancouver?(a) he towed it, (b) he hired a large boat, (c) a helicopter herded it back.

4. Why was Dr. Newman worried about Sam and Joe on the trip with the whale? (a) it was a stormy day, (b) killer whales sometimes overturn boats, (c) they were lost for several hours.

5. Why did Sam call the whale "Hound Dog"? (a) it made noises like a little puppy, (b) it was spotted like a bird dog, (c) it was tame as a pet.

6. Why did Sam stop from time to time on the trip to Vancouver? (a) to let the wale rest, (b) to let the whale eat fish, (c) to get more supplies.

7. The trip to Vancouver took (a) 17 days, (b) 17 hours, (c) 3 days, (d) d hours.

8. Dr. Newman arranged for the whale to first stay in a 200-foot (a) tank, (b) bay, (c) dry dock.

9. When Sam and Joe reached Vancouver with the whale, they were met by (a) thousands of cheering people, (b) only by Dr. Newman, (c) their wives.

10. The whale was named: (a) Moby Dick, (b) Moby Doll, (c) Doll Baby.

11. Why did Sam think he should stay on the float near Moby Doll? (a) killer whales aren't used to being alone, (b) he thought she might hurt herself, (c) he was hired to look after her.

12. Killer whales usually (a) swim alone, (b) swim in packs, (c) swim with a mate.

13. Everyone worried because Moby Doll wouldn't (a) swim, (b) breathe, (c) eat.

14. Scientists made roecordings of the whale's (a) heartbeat, (b) "talk", (c) brain waves.

15. Moby's beeps, grunts, and speals (a) called other whales to her, (b) let her know what was near her, (c) meant nothing.

16. Moby Doll finally began eating (a) 100 lbs. of fish a day, (b) 100 lbs. of lobster a day, (c) 100 lbs. of dog food a day.

17. Why did Moby Doll's skill turn gray? (a) she was not given enough food, (b) the water wasn't salty enough, (c) she missed the company of other whales.

18. Before Moby could be moved to a new pen, (a) she recovered completely, (b) she was returned to the ocean, (c) she died.

19. The care given to Moby Doll was worth the cost because (a) she taught scientists about killer whales, (b) she starred in many movies, (c) people paid money to see her.

20. A spear, fastened to a rope, with barbs that hook into an animal's flesh is (a) sonar, (b) harpoon, (c) needle-nose rope.

What Every Young Cat Ought To Know

Name _____

Please circle the letter with the best answer.

Example: Cutie had a (a) tale, (b) vale, (c) cold.

In the example you would circle (a) to show tale as the best answer.

Begin the test.

1. Cutie's tale is meant to be (a) frightening, (b) sad, (c) funny.

2. The writer, Mr. Callico, seems to (a) know cats very well, (b) hate cats, (c) like dogs better than cats.

3. Mr. Callico's story is told by (a) Cutie's kittens, (b) Cutie's mother, (c) Cutie.

4. Cutie showed that she was very clever by (a) drinking all her milk, (b) winning over the family, (c) having kittens.

5. We find out that the man was really (a) brave, (b) kind, (c) cruel.

6. When Cutie saw a man and woman eating breakfast, she (a) sat on the porch and meowed, (b) climbed the screen door and meowed, (c) lay down and waited till the door opened.

7. Who let the cat into the house? (a) the man, (b) the woman, (c) a little boy, (d) a little girl.

8. The woman gave the cat (a) some milk, (b) a bath, (c) a toy.

9. At first, the man wanted the cat to (a) come in and stay, (b) eat in the barn, (c) be given to his mother.

10. Cutie made friends with the man by (a) rubbing against his ankles, (b) catching mice, (c) staying out of his way.

11. During the thunderstorm, the man (a) put the cat outside, (b) told his wife to take care of the cat, (c) let the cat stay inside for the night.

12. Cutie says a silent meow is a good trick because it makes a cat look (a) hungry, (b) friendly, (c) helpless.

13. Soon the cat was sleeping (a) in a special bed made for her, (b) in a dog house, (c) with the people.

14. How many kittens were enough for Cutie? (a) one batch, (b) ten batches, (c) she didn't want any kittens.

15. The kittens almost (a) ate all the cat food, (b) broke up the happy home, (c) got lost many times.

16. Cutie got jealous of (a) a new dog, (b) her kittens, (c) a new a baby.

17. The kittens were (a) sold, (b) given away (c) kept by Cutie's owners.

18. Cutie was alone in the world because (a) her mother ran away, (b) her mother was killed, (c) her mother was sold.

19. During her first week in the country, Cutie ate (a) mostly insects, (b) mice and rats, (c) birds.

20. When cats feel good, they (a) scratch, (b) meow loudly, (c) purr.

Hurricane!

Name _____

Please circle the letter with the best answer.

Example: This story is about a (a) hurricane, (b) detective, (c) baseball player.

In the example, you would circle (a) to show hurricane as the best answer.

Begin the test.

1. The hurricane's name was (a) Carla, (b) Caroline, (c) Debra.

2. Most people left town because they were (a) forced, (b) warned, (c) fooled.

3. Carla struck hardest at the town of (a) Dallas, (b) Port O'Connor, (c) Galveston.

4. When Carla hit the town there were (a) no people there, (b) half the town there, (c) 11 people there, (d) 31 people there.

5. The Clariches were caring for Mrs. Alma's (a) pets (b) house, (c) children.

6. The Clariches stayed because they expected Mrs. Alma to (a) leave, (b) return, (c) help.

7. The 3 Munsch brothers weren't leaving because (a) they had never left because of a hurrican before, (b) they didn't know a hurricane was coming, (c) they had no way to escape.

8. Most people had grass in their front yards, but the

Munsch yard had (a) sand in it, (b) live oak trees in it, (c) fine gravel in it.

9. When water began to trickle in the Clarich yard and the lights went out, Chris Clarich decided to (a) leave town, (b) go to the roof, (c) get into a boat.

10. Chris could not phone for help because the line was (a) busy, (b) dead, (c) full.

11. During the storm, Chris and his wife and Mrs. Alma's children were (a) at their house, (b) at the church, (c) at the school.

12. Chris piled tables and chairs (a) on the stage, (b) in front of the doors, (c) in the attic.

13. The noise of the wind was like (a) 10 jet planes, (b) a freight train, (c) a howling dog.

14. When morning came, Chris saw (a) a rescue boat, (b) snakes twisting around window frames, (c) a bad fire.

15. The Munsch house came loose during the storm and (a) floated away, (b) broke apart, (c) the live oak trees kept it from leaving the yard.

16. The middle of a hurricane is called the (a) eye, (b) night, (c) peace, (d) ear.

17. During the middle of the hurricane, the wind is (a) much worse, (b) very still, (c) a slight breeze.

18. After the middle of the hurricane passes, the storm (a) is over, (b) begins again, (c) changes to gentle rain.

19. When the storm was over, (a) Port O'Connor was hardly damaged, (b) several homes in Port O'Connor were gone, (c) nothing was left of Port O'Connor.

20. The people who survived the hurricane were (a) stupid, (b) hurt, (c) lucky.

Cider, My Setter

Name _____

Please circle the letter with the best answer.

Example: The author stopped at a farm in (a) Vermont, (b) Texas, (c) Oklahoma.

In the example, you would circle (a) to show Vermont as the right answer.

Begin the test.

1. The author stopped at a farm in Vermont to (a) look at the leaves, (b) pick out a puppy, (c) buy some apples.

2. He picked the puppy that (a) barked loudly, (b) looked the saddest, (c) stuck a foot through the wire.

3. The puppy was (a) a collie, (b) an English Setter, (c) a husky.

4. The pup was named Cider because it made the author think of (a) fall, (b) apples, (c) trees.

5. Cider always slept (a) in the owner's bed, (b) on a soft chair, (c) in a dog house.

6. Cider's owner bought a book on training and housebreaking and (a) taught Cider many tricks, (b) lost it the next day, (c) never had to use it.

7. Cider (a) loved to play with toys, (b) played only with a ball, (c) had nothing to do with toys.

8. When Cider turned over a table, he fooled his owner by (a) hopping around on 3 legs, (b) lying down and whinning, (c) running into the house.

9. The owner knew Cider was all right when he (a) walked on his back legs, (b) chased a squirrel, (c) was checked by a vet.

10. Cider woke his owner by (a) barking loudly, (b) licking his face, (c) starring at him.

11. Cider's one great purpose in life was (a) to make sure the owner took him wherever he went, (b) to keep all squirrels out of the yard, (c) to sleep as much as possible.

12. The owner lived with (a) a wife and children, (b) his old grandma, (c) only Cider.

13. When Cider was patted, he showed his appreciation by (a) licking his owner's hand, (b) swallowing several times, (c) chasing his tail.

14. When something bothered Cider, his only protest was (a) a short bark, (b) hanging hishead and whining, (c) a quick yawn.

15. In his old age, how did Cider deal with guests who stayed past his bed time? (a) barked at them and went upstairs, (b) flopped on the living room floor and sighed, (c) went to the door and whined.

16. Mr. Ford had to take the new pup back to the farm because (a) it was too young to leave its mother, (b) Cider seemed jealous of his son, (c) the pup was sick.

17. When Cider became a father, the author chose a puppy that (a) yawned like Cider, (b) looked like Cider, (c) barked like Cider.

18. Why did Cider at 13 seem like an old man in his 90's? (a) his manners were as good as those of a 90-year old man, (b) his fur turned snow white, (c) each year of a dog's life is about the same as 7 of a person's.

19. When the vet came to take Cider to the hospital, the author (a) kissed him for the first and last time, (b) couldn't say goodbye, (c) refused to let him go.

20. After Cider died, the author (a) never got another dog, (b) took Cider's pup again, (c) bought a cat.

APPENDIX B

ANSWER SHEET EXAMPLE FOR THE LISTENING TESTING METHOD

Snowshoe Thomson

Name_____

Please listen carefully. Listen to each question and all the answers. Select the letter of the best answer, "a", "b", "c", or sometimes "d" and write it on the blank next to the number of question.

1._____ 11._____
2._____ 12._____
3._____ 13._____
4._____ 14._____
5._____ 15._____
6._____ 16._____
7._____ 17._____
8._____ 18._____
9._____ 19._____
10._____ 20._____

VITA 2

Ronald Glenn Payne

Candidate for the Degree of

Doctor of Education

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