



A Comparison of Two Methods of Teaching Beginning Reading
by Earl William Britton

A thesis submitted in partial fulfillment of the requirements for the degree of DOCTOR OF
EDUCATION

Montana State University

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Abstract:

This study dealt with an attempt to determine which method of teaching beginning reading to first grade children was most efficacious: a meaning-emphasis or code-emphasis method? Through a review of literature and an analysis of data, it was hoped that the following questions would be answered: 1) What composite factors determine the reading ability of a child? 2) What are the definitions of code-emphasis and meaning-emphasis programs of teaching reading? 3) What is the current philosophy in these two methodologies? 4) Will there be a significant difference in final standardized achievement test scores between groups taught beginning reading by the two methodologies? In order to answer the preceding questions and complete the study, the following procedures were followed: 1) establishment of a workable definition of the reading process, 2) development of an experimental design in which the control of natural processes is attempted and observed, 3) review of literature and related research dealing with the two methods for teaching beginning reading, and 4) analyzing and interpreting tests administered to the children in the program.

Based on the results of the procedures outlined, some of the major conclusions reached were: 1) the mechanics of the reading process are merely a means to an end in the communication process that occurs between an author and a reader, 2) the abilities that a child brings to beginning reading are determined by a combination of social, genetic and environmental factors, 3) the code-emphasis method of teaching beginning reading produced, in this study, statistical evidence of greater achievement than did the meaning-emphasis method.

Major recommendations, based on this study, are: 1) a predominantly code-emphasis method of beginning reading instruction could be used in a middle class area school to produce greater achievement than a meaning-emphasis method, 2) further research should be conducted to determine which method of teaching beginning reading would be more effective in other socio-economic areas, 3) all school personnel could profit from more training in the teaching of reading concept as it is a basic and complicated process, 4) schools should emphasize the importance of early childhood development to parents, 5) both methods of teaching reading should be included in all basal beginning reading texts, 6) further research should be conducted to gain greater insight into the complexities of teaching beginning reading.

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August, 1974

ACKNOWLEDGMENTS

Acknowledgment is made to my reading committee, Dr. Willis Vandiver and Dr. Richard Horswill and to the other members of my committee, Dr. Del Samson and Dr. Eric Strohmeier. Special thanks are extended to my advisor, Dr. Gerald Sullivan, who assisted me not only with his time and counsel, but with moral support which was especially appreciated.

I also want to extend my appreciation to Paul T. O'Hare, Superintendent of Public Schools in Billings, Montana, for making it possible for me to obtain a Sabbatical Leave for the year 1970-1971 to pursue my studies.

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ABSTRACT

This study dealt with an attempt to determine which method of teaching beginning reading to first grade children was most efficacious: a meaning-emphasis or code-emphasis method?

Through a review of literature and an analysis of data, it was hoped that the following questions would be answered: 1) What composite factors determine the reading ability of a child? 2) What are the definitions of code-emphasis and meaning-emphasis programs of teaching reading? 3) What is the current philosophy in these two methodologies? 4) Will there be a significant difference in final standardized achievement test scores between groups taught beginning reading by the two methodologies?

In order to answer the preceding questions and complete the study, the following procedures were followed: 1) establishment of a workable definition of the reading process, 2) development of an experimental design in which the control of natural processes is attempted and observed, 3) review of literature and related research dealing with the two methods for teaching beginning reading, and 4) analyzing and interpreting tests administered to the children in the program.

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CHAPTER 1

INTRODUCTION

One of the most oft-discussed subjects in elementary education concerns that of arriving at a productive and effective means of teaching children to read. Strangely enough, in addition to the effectiveness controversy, there seems to exist a confusion as to the definition of the term "reading." Spache (64:4) noted:

Although it is often avoided in books about reading, one of the major problems in reading instruction is a definition of reading. Without a clear-cut concept of the nature of the reading act and the reading process it is almost impossible to plan the goals of instruction.

Reading has been defined in various ways. These definitions range in complexity from simply stating that reading is understanding the intent of the author to the more comprehensive, sophisticated statement that to read is a mechanical process involving many physiological and cognitive skills.

Dr. Vandiver, Professor at Montana State University, (69) says "reading is a decoding process, in which the reader interprets and evaluates the author's intended meaning in terms of the reader's background, experience and understanding."

Rosner (35:3) states that:

learning to read, regardless of instructional method, necessitates the establishment of visual-vocal equivalences. To progress beyond a very limited sight vocabulary level, the child must acquire the discrete equivalences represented by the grapheme-phoneme interrelationships. He must discriminate and

relate a visual symbol to its phonetic counterpart and produce the latter in organized, connected sequences.

Rosner's expressed viewpoint above, in reference to a definition of reading sets the focus of this paper. He indicates that a complicated process occurs at the beginning of the formal, schooling stage of a child's reading development.

Reading appears to be more than a mechanical process and can only be measured by determining the level of understanding attained by the individual within whom the process is occurring.

The consummate level of judging the success of reading as a process is undoubtedly measured by the individual himself in the manner that he interprets meaning represented by the written symbols into meaningful thoughts and then puts these thoughts to functional use. Prior to reaching this degree of proficiency in the reading process, the individual must first learn to interpret or decode the written symbols.

Rosner (55:9) also mentioned that:

...although reading undoubtedly is dependent upon the presence of many skills, the ability to analyze verbal acoustic information seems critical to competency at the decoding level.

According to Tinker and McCullough (68:67), "Only when printed symbols stand for words used meaningfully in his own speech is the child ready to read successfully." Generally speaking, this initial aspect of the reading process begins formally at the kindergarten or

first grade levels in the traditional school.

George (29:2) pointed out that:

Proponents of beginning reading instruction approaches often fail to point out important variables, other than the mechanics of the approach, which contribute to success or failure in beginning reading. Three other major factors, the teacher, the child and the environment are infinitely variable and must be given due consideration.

Development of perception and the opportunities for sensory-perceptual training, which involve home environment, socio-economic status of the parents, motivation of the individual child, physiological development and the teacher, all play a role in the development of a child's reading skill.

Perception involves visual and auditory receptors and the assimilation of these types of stimuli into the total cognitive and affective process. Deutch (17:15) states that:

Studies investigating the auditory perceptual skills of disadvantaged subjects are fewer in number, but the findings are more consistent. Results indicate that subjects from impoverished environments achieve lower auditory modality functioning in comparison to visual functioning and reveal inadequate auditory perceptual skills coexistent with retarded achievement.

Apparently, then, some thought must be given to the socio-economic status of the parents which might be translated into a home environment that is deficient in the provision of sensory stimuli and/or the inculcation of perception skills necessary for successful reading.

A child from a low socio-economic home or a different

cultural orientation from so called "middle class American society" then, might be subjected to different cultural experiences that could influence his reading success.

Hockman (41:581) says that:

Alarming numbers of urban Black children have trouble learning to read. Attention has been focused on the Black child's dialect since his language development may make it difficult for him to learn to read with standard materials.

She (41:583) mentions that "studies investigating the speech of black headstart and grade school children indicate that they do speak a different dialect."

Motivation and psychological readiness for reading must also be considered in terms of the total social milieu that nurtures the children who are sent to school.

Recognizing these various dimensions of a child's development that have some effect on his success in the act of reading could be helpful to people dealing with the teaching of beginning reading. Teachers also must consider a child's physical and emotional well being.

Bannatyne (1:6) writing in this area tells us that:

reading is a very complex psychological process, the varied ingredients of which may differ in amounts from one individual to the next. One child may have slight central nervous system (CNS) defects; one child may find decoding to be a particular problem while another may have difficulty in remembering sound symbol associations. Still others may lack the necessary motivation to speak or to read their native language.

Generally speaking, the initial aspect of the reading process begins formally at the kindergarten or first grade levels in school. However, many times the success of the individual child in learning to read is determined to a large degree by previous verbal background interaction and sensory experiences that he had before coming to the formal school situation. Perhaps the pre-school experiences are more important than the procedure used for reading instruction during the first year at school. Tinker and McCullough (68:67) point out that "Successful reading required that the child come to the reading situation with a background of relevant information derived from experience."

Heilman (38:26) corroborates this statement when he says:

many black, Chicano, American Indian and impoverished white children have grown up in ghettos. The educational significance of this is that their contact with the main cultural stream was systematically curtailed.

To further substantiate that a child's pre-school experiences shape his reading destiny, Bannatyne (1:19), speaking of the culturally deprived child, says:

during the critical phase of language development and differentiation from birth to four years of age, the mother or mother-surrogate has not given her child sufficient verbal stimuli for the child to develop an accurately differentiated appreciation of the spoken language and/or clarity of speech.

Obviously, then, reading qualitatively must be concerned with the intimate domestic environment of the child. The dyadic relationship in which mother and child interact during the formative

developmental years shape the linguistic response patterns of the individual child. The development of language has a direct bearing on successful reading patterns. Fries (26:113) says that:

an understanding of the nature and functioning of language must form the foundation upon which to build an understanding of the derived processes of writing and reading. Language must come first.

Chomsky (15:25) added that:

....to learn a language, the child must have a method for devising an appropriate grammar, given primary linguistic data. As a pre-condition for language learning, he must possess, first, a linguistic theory that specifies the form of the grammar of a possible human language and, second, a strategy for selecting a grammar of the appropriate form that is compatible with the primary linguistic data.

During this period of language development, it is also necessary to provide motivation and materials for the encouragement of pre-reading skills. Brzeinski and Howard (9:241) found that pre-primary children should be "surrounded with reading materials of many types, ...it was found that many of the top first-grade pupils were read to regularly before they entered first grade."

For the most part, authorities agree that the experiences in the formal reading program, as provided in the first year of school, to a great degree determine the future success in the attainment of the highest level of reading ability that any individual will reach. Heilman (39:81) indicates that "attitudes and habits acquired by children during the beginning reading period influence later reading

behavior." In another reference Heilman (38:27) continues by saying that "the beginning stage of reading is extremely important," and that "It is during this period that the child develops attitudes toward himself, toward reading and toward competition."

The beginning reading process, for any individual child at the first grade level of development, is also dramatically influenced by the child's teacher.

An editorial (65:415) in The Reading Teacher stated that a teacher's responsibility "is helping children and young people to develop as whole persons...by leading from a child's interests to a greater level of personal capability and self-awareness."

From these statements an idea may be gained of the importance of the role the teacher plays in shaping the beginning reader. Hafner and Jolly (35:1) confirm this by noting that:

it is essential that the classroom teacher know what reading is, for his idea of what reading is determines how he teaches it...some people teach as if reading were just calling words accurately. Others think it is the ability to get a rough idea of the meaning of a passage.

Another area of influence in the beginning reading success of the individual child is the sex factor. Being a boy or a girl, according to some authors, is a significant aspect of successful beginning reading.

Heilman (38:38) reports that a study carried out at the University of Michigan indicates that girls learn to read at the

beginning stages more rapidly than boys. Bannatyne (1:15) when speaking of reading problems of children, says that the incidence "will be at least two percent of the school population and will be mainly boys."

The male deficit in the beginning stages of reading is soon obliterated, however. Good and Brophy (32:257) state that:

...girls learn to read faster than boys...In any case, the educational deficit does not appear to be exceedingly important--boys for the most part suffer no harm from the initial gap and eventually catch up.

Heilman (39:38) corroborates this statement when he says, "Once children achieved a reading age of eight years, four months on the Gates Primary Reading Test, no difference between boy's and girl's rate was found."

There is also some evidence to suggest that the superiority which girls hold over boys in learning to read at the beginning stage is cultural and may not be true in societies other than the United States. Bannatyne (1:75) tells us that "Now, it is very obvious that many sex differences are at least partially caused by nurturance, social and other environmental influences."

Heilman (38:37) says that:

Preston's study of reading achievement of German children reports sex differences favoring boys. In addition, he reports more variability among scores made by girls, which is at variance with most findings of American studies.

There appears to be much concern with the contemporary implication that the schools are failing to meet the reading needs of many students. Herber (40:499) suggests that:

there is a segment of our population whose reading needs have not been met because our methods and materials have been inappropriate. It is necessary for us to concentrate on finding and demonstrating methods and materials appropriate to their needs.

Brzeinski and Howard (9:240) state that:

....the writings of Chall, Durkin, Cohen, Robinson, Smith, among others, and the current United States Office of Education 'Targeted Programs in Reading' are indicants that the basic quest remains unfulfilled--namely that every child will attain reading competence to meet both his individual needs and those of an urban, technical, industrialized culture"

The selection of methods and materials has created many heated debates in the field of the teaching of reading. On the contemporary scene, much of the debate is concentrated at the beginning stages of the decoding process. Generally speaking, the debate concerns materials and methods stemming from two basic philosophies, which Chall (14:75) identifies as that emphasizing a code (synthetic) approach and the other emphasizing a meaning (analytic) approach, which is in turn based on a sight word concept of instruction.

STATEMENT OF THE PROBLEM

In the area of the teaching of reading to elementary school children there is much concern in professional educational circles regarding what constitutes an effective method or combination of

methods to use which enable the children to achieve the best reading skills and attitudes.

Much relevant research has already been done to find a clear-cut answer to the problems involved in determining an effective method of teaching children to read, yet, the question seems to remain unsolved and appears to demand further research.

The problem of this study is to investigate whether there are differences in the reading achievement of four comparable groups of first grade children when two groups are taught by the code-emphasis method and the others by the meaning-emphasis method.

NEED OR PURPOSE OF THE STUDY

Reading is one of the most important of the educational skills that a child learns in school. It is also the basis for learning in our culture and as such has been subjected to much scrutiny by educators and lay people alike.

According to Chall (14:73), children may learn to read with the use of both the meaning emphasis and the code emphasis methods, but advocates of each claim superiority. The results of this study could have some importance for future selection of reading series and basic methodology implemented into individual school reading programs. At least it might serve to answer the question of which method proved most effective in teaching beginning reading in a certain situation

and geographical area.

GENERAL QUESTIONS TO BE ANSWERED

This study attempts to answer five questions: (1) What factors, on a composite basis, determine the reading ability of a child? (2) What is the definition of a code-emphasis program of teaching reading? (3) What is the definition of a meaning emphasis program of teaching reading? (4) What is the current philosophy in the code-emphasis and meaning-emphasis methodologies of teaching reading? and (5) Which group of first graders, the group taught by the meaning-emphasis or the group taught by the code-emphasis method, will achieve the highest scores on two different standardized achievement tests?

GENERAL PROCEDURES

The general procedures in conducting this study are as follows:

- (1) Establishing a workable definition of the reading process.
- (2) The development of an experimental design in which, according to Sax (59:340), "those ideas, issues, principles, and techniques peculiar to these investigations (study) in which the control of natural processes is actually attempted and directly observed."

The two first grades in each of two schools in the Billings Public Schools were selected for the purposes of this study. Some of the techniques involved in this experimental design will be discussed

at this point:

All of the children in the four classrooms selected participated in the study, except those who came to any room later than November 1, 1971.

The individuals for the two participating classrooms in each building were selected on the basis of a sampling procedure that would relate the sample to the population. Also the sample would insure that sex, age and socio-economic categories have been considered.

The children in the four classrooms had their vision and hearing checked so that these contaminating factors were controlled in terms of the final achievement. All of the children's vision was checked by the Lazy Eye Clinic and no child had non-correctable problems as determined by the Clinic. The school nurse administered an audiology test to each child. None of the children in the study had either vision problems or hearing problems that would impede their learning to read. According to Bannatyne (1:31), "it is no doubt true that many normal people do have poor visio-spatio skills, this is not . . . a handicap to reading." Apparently, even if some deficiencies do exist, this is not necessarily a deterrent to learning to read.

The teachers to whom the control and experimental groups were given for instruction were selected on the basis of the two in each building who were most similar in education, technique and ability, as determined by the building principal and the reading supervisor.

All the teachers had experience teaching at the first grade level, and had orientation regarding the nature and purposes of the study.

All four teachers had a minimum of four years of professional teacher's preparation, and all received the baccalaureate degree from Eastern Montana College in Billings, Montana. None of the teachers had the Master's degree. All of the teachers had at least two years of successful teaching experience in the Billings Schools. Each of them had taught two years in the building in which they were teaching when the study was conducted.

All four of the teachers were considered by the building principals and reading supervisor to be at least average first grade teachers who taught in a conservative, traditional context of methodology. Despite the similarities in back ground, education and orientation for the study, teachers do have individual and sometimes unique approaches included in their teaching methodologies. This is a factor that could not be controlled.

In selecting the schools used in the study, it was desirable that a population be utilized which was, to as great an extent as possible, representative of the general population of Billings, Montana, where the study was carried out.

The writer chose schools which were located in areas which encompass the major socio-economic levels to be found in Billings.

Thus, the three major socio-economic divisions (upper, middle, and lower) were represented in approximately the same proportion as they were found in the city of Billings as a whole. The two schools, Rose Park and Grand Avenue Elementary Schools, were located within seven blocks of one another and some of the parents had the option of sending their children to one or the other school on the peripheral borders of each. A majority of the parents of both schools were average-income, white and blue collar workers. These could be considered as belonging to the middle class. An even smaller proportion of the parents of each school were higher income, professional people such as doctors and lawyers and could be relegated to the so called upper class. The smallest proportion of the parents of the two schools were composed of welfare, transient and casual labor elements. These people could be considered to belong to the lower class economic strata.

According to the City-County Planning Board of Yellowstone County and Billings, Montana (75), Table I indicates the proportion of socio-economic groupings as discussed above. (This table is based on the 1970 U.S. Census and information survey by the Planning Board done in the spring of 1972.)

Table I bears out the statement (categories defined by the Yellowstone Planning Board) that these two schools have populations that can be categorized as low, middle and upper socio-economic strata and that the smaller percentages of the populations lie at the extreme

ends of the spectrum, with the largest number in the middle income group. The schools, then have proportional samples of each of these categories and are fairly representative of the City of Billings as a whole.

TABLE I
LEVELS-OF-INCOME TABLE (Percentages)

	Grand Avenue School Area	Rose Park School Area	City of Billings
Under \$4,000 (low income)	18.3	9.2	12.0
\$10,000-\$14,999 (middle income)	22.5	38.0	29.0
Over \$25,000 (high income)	2.3	6.2	5.0

The Metropolitan Reading Readiness Test was used to determine the comparative reading readiness abilities of the children as they entered first grade and the scores derived were used as the co-variant which could not be controlled. It includes four scores related to reading readiness: word meaning, listening, matching and alphabet recognition.

Two instruments were used to measure the reading achievement at the end of the school year. One test was The Durrell Analysis of Reading Difficulty (an individual test), which includes sub-test

categories of: oral reading, silent reading, listening, word recognition (flash words) and word analysis. The other test was the Stanford Achievement Test (a group test) and includes sub-test categories of: word reading, paragraph meaning, and vocabulary (word meaning) categories. These listed sub-test categories were used to measure the reading achievement at a point seven months after the student had entered the first grade in school.

The two groups were taught by the control method which was the basal series used in the Billings school district at the present time. This series was the Scott-Foresman text and, according to Chall (14:202), utilizes the meaning-emphasis approach to the teaching of reading. An examination of the literature, however, indicates that neither code-emphasis nor meaning-emphasis approaches are pure in terms of methods of teaching phonics elements and thus cannot strictly insure that each of the teachers would teach one approach for the code-emphasis and another for the meaning-emphasis methods.

The two groups taught by the experimental method used the basal series referred to as the Lippincott Series. Chall (14:233-257) classifies the Lippincott Series as a phonics-first basal reader. The series utilizes the code-emphasis approach to decoding in the use of regularly introduced words that are graphemically-phonemically consistent, and it stresses meaning from the very beginning lesson. Dykstra (22:18) also labels the Lippincott Series as a phonics-first basal which uses the

code-emphasis approach.

Many linguistics textbooks use the code-emphasis approach also and, as Bloomfield (6:7) mentions, the child is taught to read at the beginning stage of instruction "by teaching him to associate letters and sounds in a vast number of different patterns." However, according to Dr. Vandiver (69), "Using the 'linguistics method' utilizes the regularly introduced word concept, sometimes to the point of ridiculousness." For this reason, a phonics-first rather than a linguistic basal was selected for use by the experimental groups in this study.

The basic difference, then, between the Scott-Foresman basal text used by the group taught by the control method and the group taught by the Lippincott basal, experimental method is that the Scott-Foresman series uses the meaning-emphasis method and the Lippincott uses the code-emphasis method. The Lippincott basal series also stresses the introduction of short vowels earlier than does the Scott-Foresman series.

Literature and related research dealing with current thinking regarding two basic methods of teaching beginning reading--code-emphasis and meaning-emphasis--will be reviewed and presented in Chapter 3.

The tests administered to the children yielded data that will be analyzed and interpreted in Chapter 4 of this study.

The final procedure will be the writing of the summary, noting conclusions and recommendations as a direct result of the content of the Review of Literature and the analysis of data.

LIMITATIONS

The study will be limited in the following ways:

(1) This paper is limited to the study of four first grade classrooms in Billings, Montana, which comprised the population sample. In terms of the scope of the study, this sample was limited in size. It would not be intended to be used for broad, comprehensive recommendations for the most effective method of teaching reading but, would hopefully be useful to the Billings Public Schools. It included members of the three basic socio-economic groups--lower, middle and upper, however.

(2) The writer found it nearly impossible to control the teacher variable. The teachers were not of identical qualifications, but attempts were made to include teachers with a minimum of four years of college and who had similar philosophies of teaching. The ages of teachers, their years of experience and their exact methods of teaching phonics could not be controlled. Every teacher has her own individual style of teaching methodology. The concept of teaching by an analytical method or a synthetic method of teaching reading with its emphasis upon phonics and word analysis, will be interpreted differently by

each individual teacher and must be admitted to. The controls of the teacher variable will be discussed in Procedure number two of Chapter 2.

(3) The two philosophies of teaching reading, code-emphasis and meaning-emphasis, are not completely polarized in terms of their philosophic approaches to the teaching of phonics in beginning reading.

(4) The pre-school experiences that each child had prior to coming to the first grade varied.

(5) The research done for the review of literature section of this paper was confined to the libraries of Montana State University and Eastern Montana College and included the ERIC Documents for the period of time 1970-1972. The two libraries are accredited and should have materials diverse enough to allow a comprehensive review.

(6) The principals in the two buildings perhaps had varying philosophies of supervision, but the reading supervisor was the same for both schools.

(7) The time devoted to teaching the reading process could possibly vary in each of the four classrooms. The time for teaching of the reading process was for the main part, from 8:30 in the morning to 11:00 in the morning.

(8) The ages of the children in the groups varied to some degree. An attempt was made to control the age categories in each of the classrooms, but this was impossible to do to the degree that each

age category was completely represented on an equal basis.

(9) An attempt was also made to control the sex category in each classroom so that an equal proportion of both boys and girls were in each. This too was impossible, so that in the final analysis, there was a slightly uneven distribution.

(10) New children that entered the classrooms later than September could have an effect upon the group achievement results in that they would not have equal time in either of the two teaching programs as did the original children involved in the study.

Each of the ten limitations will be discussed more intensively in procedure two of Chapter 2.

DEFINITION OF TERMS

This portion of the paper deals with the key terms of the investigation.

Auditory discrimination - The ability to hear likenesses and differences in speech sounds. Hafner and Jolly (35:37)

Basal reader - This is a textbook, usually part of a graded series, used for instruction in reading. Good (30:472)

Code-emphasis - This is the teaching of reading which emphasizes instruction by the use of an alphabetic code capable of being arranged in specific categories or combinations. The emphasis on letters and letter combinations is used. Chall (14:75)

Decoding - The process in reading of translating printed symbols into speech sounds. Savage (58:xv)

Encoding - intentional selection of meaningful (information) units, their grammatical integration and expression via motor pathways [writing] . Bannatyne (1:53)

Graphemes - A graphic symbol used in writing; a basic unit of the writing system of a language. Refers to letters of the alphabet, punctuation marks, and so forth. Savage (58:xvi)

Linguistics - The scientific study of language. Savage (58:xvii)

Meaning-emphasis - When meaning is emphasized from the start in reading instruction. This teaching of reading approach places its emphasis on teaching whole words or groups of words as they are used to produce a meaningful idea or thought. Chall (14:75)

Morpheme - A single, basic, meaning-bearing unit of a language. Savage (58:xvii)

Phonemes - A basic, indivisible, minimal unit of sound. The smallest usable unit of speech sound in a language. Savage (58:xviii)

Phonics - Phonics is the study of those letters, letter combinations and syllables consistently representing sounds, that are taught as a means of enabling the reader to recognize and pronounce words independently. The phonic method is that method of teaching reading based on the analysis of words into their basic speech sounds. Good (31:329)

Phonic-first basal - This is a basal reader that introduces words in a meaningful reading context only after the words have been analyzed through a phonics, code-emphasis process. Dykstra (22:22)

Sight Word - The known with which teachers work to help pupils learn techniques that will aid them in attacking unknown words independently. Gray (34:3)

Visual Discrimination - Seeing likenesses and differences among visual forms. Hafner and Jolly (35:37)

SUMMARY

One of the most oft-discussed subjects in elementary education concerns that of arriving at a productive and effective means of teaching children to read.

The two of the most discussed methods manifest themselves in the philosophies of the code-emphasis and the meaning-emphasis methods.

There are many diverse definitions of reading but generally it is defined in terms of understanding what the author intended to be understood.

The background that a child brings to the first grade plays a great role in the success that the child experiences in reading. The formative years of birth to first grade, including the various social interactions involved in the individual child's home environment, have great impact on the success.

During the first year of school, the teacher, the child's past experiences, his self-image and the materials utilized all play a role in determining the pupil's reading success. Motivation and psychological readiness for reading must be considered.

Another factor usually considered is a child's sex, especially in the first few months of the first grade experience. This factor does not matter too much and as one author Good (32:257) says that, . . . boys for the most part suffer no harm from the initial gap and

eventually catch up."

The establishment of a working definition for the process of reading was the first procedure in the study. The next procedure will be the development of an experimental design by which to conduct the study. Two schools were selected, each of which had a representative sampling of parents belonging to the three major socio-economic groups. These representative samples were equal in size in each school and were also representative of these three major socio-economic groups in the city of Billings.

From these two schools, two classrooms of first grade children were selected in each school; one classroom in each school was taught beginning reading with the Scott-Foresman basal reading series--a meaning-emphasis method. Also, one classroom of children from each school was taught with the Lippincott basal reading series, a code-emphasis method.

The children were tested in May of the following year so that a statistical evaluation could be conducted from which to make inferences, as to which groups of youngsters made the greatest achievement in several areas of reading ability.

The next procedure in this study will be to review literature and research related to current thinking regarding two methods of teaching beginning reading--the code-emphasis and the meaning-emphasis approaches. This review is found in Chapter 3.

The next procedure in the study will be to present and analyze the data gathered as a result of administering the three tests; Metropolitan Reading Readiness Test, The Durrell Analysis of Reading Difficulty and the Stanford Achievement Test. This will be done in Chapter 4.

The final procedure will be to discuss the data that will be presented in Chapter 4 in the form of a summary and to offer recommendations and conclusions based on the observations of the data. These recommendations and conclusions will be presented in Chapter 5 of the study.

CHAPTER 2

PROCEDURES

The procedures to be used in this study and the criteria for their inclusion will be discussed in this chapter. It should be noted that the procedures discussed below appear in chronological order and are as follows:

PROCEDURE ONE

The first procedure of this study was to establish a working definition of the reading process. This procedure was discussed in Chapter 1 with the presentation of what the writer felt was a workable definition of the process involved in reading.

This definition of reading then set the stage for setting up an experimental design that indicates the parameters of the study and the procedures for carrying it out.

PROCEDURE TWO

Procedure two will be the development of the experimental design that will be intensively discussed to indicate the depth of the study and the statistical methods involved.

This section deals with the experimental design to be used in conducting the study. The problem in the study will be to investigate whether there are differences in reading achievement of comparable

groups of children at the first grade level when two classes are taught by the code-emphasis method of beginning reading and the other two classes are taught by the meaning-emphasis method of teaching beginning reading.

Population Description
and Sampling Procedure

The two sample groups are comprised of all children in the four classrooms selected to participate in the study. The population is the total number of first grade pupils in the Billings, Montana Public School System.

To choose the sample groups from the total population, two schools were selected: Grand Avenue and Rose Park Schools. Each school had two classrooms of first grade children. At each school one classroom was placed in the sample group taught by the experimental method and one classroom was placed in the sample group taught by the control method. Both schools have populations representative of the typical socio-economic levels found in the city.

For the purposes of the study, children entering the first grade in each of the selected schools were matched on the basis of age and sex as far as this was possible.

PROCEDURE THREE

The third procedure will be to review related literature and research discussing two methods of teaching children beginning reading.

The scope of this review will include research regarding a code-emphasis method and a meaning-emphasis method of teaching beginning reading.

This review was organized to discuss the following areas pertaining to the two preceding methods of teaching reading:

Early Childhood Socialization

This section will deal with the importance of the first years that a child is involved with the interaction processes as he proceeds through life's experiences. These experiences will be, for the purposes of the paper, viewed from the symbolic interactionist perspective. These social experiences will be viewed in terms of the impact that a child's formative environment make on the type of reading success that he experiences in school.

The Ability of the Child

This section will deal with the concept that the acquisition of verbal ability to the degree necessary for the child to learn to read can be thought of in terms of a facet of intelligence.

One of the difficulties to be discussed is that of selecting an instrument to measure a child's ability to read.

Some definitions of intelligence will also be discussed.

The Code-Emphasis Method

The code-emphasis method of teaching reading will be discussed in respect to learning to read. The child, in the beginning reading stage, proceeds from parts to wholes and learns letter-sound relationships that are later combined to form words.

The decoding process as an integral portion of the code-emphasis method will be discussed and reviewed in this section.

Similarities in methodology between the Code-Emphasis and Phonics method of beginning reading instruction will be discussed in this section also.

The author will also rely upon documentary research in an attempt to indicate the similarities among Linguistic, Phonics and Code-Emphasis methods of teaching reading.

An attempt will be made to discuss the reading process as a function of portions of the cerebral area and central nervous system in this section.

Then, some of the literature reviewed will be presented that indicates some reservations concerning the use of the code-emphasis method of teaching beginning reading.

The Meaning-Emphasis Method

The section of the review of literature will be used to illustrate a working definition of the meaning-emphasis method of teaching beginning reading.

In addition, it will be brought out in the review that the meaning-emphasis method of reading instruction does attempt to promote the gaining of meaning as the primary purpose of reading.

The procedures involved in the teaching methodology will be discussed for a comparison between the code-emphasis and meaning-emphasis methods of teaching reading.

Limitations and Explanations of the Limitations

(1) The small sample, in that the study was limited to four classrooms in two schools was necessary because of the cost of supplying textbooks and other related materials to the students. The cost of these materials had to be completely borne by the writer.

The sample could not be considered either a random or stratified random sample, since not every pupil entering the first grade in the Billings Public Schools had the opportunity to be involved in the study on the basis of being placed on a table of random samples. Also, there was no way to anticipate or have prior knowledge of the ages and sex of the beginning first graders involved in the study, so it could not be a stratified random sample.

The writer agreed with Furgason (27:135) as he says, "It (the sample) may not differ from a random sample as far as these characteristics are concerned, the investigator may be prepared to regard it as representative of the larger group." The sample was thought to be representative of the larger group.

(2) The teachers to whom the control and experimental groups were given for instruction were as equal in terms of technique and ability as possible. However, no teachers were transferred for the purposes of the study.

The teachers were of comparable training with a minimum of four years and a maximum of five years of college education. The age and experience of the teachers could not be controlled due to the fact that teachers were not transferred on an inter-building basis for the purpose of this study. However, all four teachers had identical in-service orientation regarding the nature and purpose of the study. This orientation could not completely control the variable of individual teacher differences in methodology, however. Teacher variability in terms of unique methodology is inevitable in any study of this nature. However, the reading supervisor for the school district stated, that as he knew the teaching styles of all four teachers, he would evaluate them all as having traditional teaching philosophies and methodology. So from his viewpoint there was similarity of philosophy.

(3) Another limitation is the problem that each of the two teaching methods as implemented by the Scott-Foresman and Lippincott programs have overlapping philosophy and teaching procedures. Neither is pure in terms of a polarization of teaching procedures. However, there are some differences that are consistent enough to allow for and justify the rubric of analytic and synthetic methodology, as will be discussed in the explanation of the two methods in the Review of Literature in Chapter 2 of this paper.

(4) Yet another limitation that must be admitted to is the pre-school experiences that each individual child undergoes prior to his formal school attendance. The home environment of the child and all of his learning experiences that occur before school began (to be discussed in the Review of Literature) could not be controlled for the purposes of this study. An attempt to make a statistical adjustment for this uncontrolled variable was made in the selection of the analysis of covariance statistical technique used for the purposes of the study.

(5) The research done for this paper was not completely exhaustive. It was done in only two libraries, at Montana State University and at Eastern Montana College, and included the ERIC Documents for the period of time 1970-1972. The two libraries are accredited and should have materials diverse enough to allow a comprehensive review of literature, however.

(6) The principals in the two buildings perhaps had varying philosophies of supervision. This is a factor that could not be controlled as the two were different people. However, there was communication between the two and the basic goal of attempting to determine which of the two reading methods would produce the greatest achievement, was agreed upon by the two principals, as was the procedure involved in the study.

In addition to the agreement between the two, the reading supervisor was the same for both schools, which could add a dimension of continuity as far as supervision was concerned.

(7) In an attempt to control the time variable, the teaching schedules with regard to the teaching of reading, were reserved for the period of time from 8:30 in the morning to 11:00 five days per week. During this 2½ hour period, each child was receiving teacher to pupil group instruction for approximately 30 minutes per day. The remainder of this block of time was devoted to independent work such as workbook completion, coloring activities, copying and writing exercises related to the reading process.

The supplementary materials were similar in all four classrooms. During the afternoons, the children worked in materials designed to promote the learning of reading skills. Books from the Ginn Basal Reading Series, and other meaning-emphasis materials were used by all four classrooms. No supplementary phonetic materials were

used for any of the four groups of children. This was an attempt to control the differences in materials that could have been a contaminating variable in the study.

(8) The age category took into consideration the aspect of different maturational levels of ability for different chronological ages. Each classroom had a mean age distribution of 77.4 as illustrated in Table II below.

TABLE II

AGE DISTRIBUTION OF THE PUPILS IN THE SCOTT-FORESMAN
PROGRAM AND LIPPINCOTT PROGRAM

Scott Foresman $\bar{X}$	Lippincott $\bar{X}$
77.4 months	77.4 months

The pupils were divided into age categories on a linear scale of 5-10 to 7-10. The categories were divided into ages with a four month differential as follows: 5-10 to 6-2, 6-3 to 6-7, 6-8 to 7-0, 7-1 to 7-5, and 7-6 to 7-10. One child from each age category was placed in the alternate classroom in each school so that the pupils in the Scott-Foresman program had as equal as possible age distribution with those pupils in the Lippincott program.

The age factor was then treated by the statistical technique, the mean ($\bar{X}$) to relate the samples

for both the Scott-Foresman method and the Lippincott method of instruction.

It may not have been important to have similar age groupings in each classroom, however, because as Heilman (39:31) says, "Research data appear to be in agreement that mental age is more closely related to success in reading than is chronological age or I.Q." At any rate this factor was considered.

(9) The sex category took into consideration the feeling of some that being a male or female makes some difference in attaining various intellectual skills. Wechsler (71:148) mentions that "our findings do confirm . . . that men not only behave but think differently from women." Vandiver (69) mentioned, that, "Boys have different problems, according to various experts, than do girls, in the learning-to-read process." Because of these ideas, an attempt was made to place an equal number of boys and girls in each of the four classrooms.

The pupils were placed in each of the two classrooms at each of the schools as follows: a boy in one room, then a boy in the other room; after this procedure, a girl in one room, then a girl in the other.

There were twenty two children in the classroom taught by the Lippincott method at Rose Park School and twenty three in the classroom taught by the Scott-Foresman method, for a total of forty five; but there were only nineteen children in each of the rooms at Grand

Avenue School for a total of thirty eight. Thus there was a greater number of boys than girls when the total group taught by the Scott-Foresman method of instruction was compared with the total group taught by the Lippincott Method. The distribution is shown below:

	<u>Boys</u>	<u>Girls</u>	<u>Total</u>
For Lippincott	20	21	41
For Scott-Foresman	<u>23</u>	<u>19</u>	<u>42</u>
Total	43	40	83

Consideration was given to placing children in each of the groups taught by the experimental method and the control method of beginning reading instruction. It would have been desirable to place children in each group on the basis of potential success in beginning reading. This success might have been predicted by the results of a reading readiness test, since Heilman (39:29) points out that "in general, the experimental data indicate a positive relationship between scores on readiness tests and success in beginning reading . . ."

This placement of children on an equal paired basis (in terms of readiness) in the two groups was impossible, however, because the readiness tests could not be administered prior to the first or second week of school, at which time the children had already been placed and settled into their rooms. This factor of inability to place by readiness test and inability to control pre-school

experiences was the justification for the selection of the analysis of covariance as a statistical procedure.

(10) Children entering either of the two schools at a later date than the beginning of school, might prove also to be a limiting factor. These children, not having been exposed to the procedures as defined by the format of the study could possibly affect the results of the pupil achievement at the end of the testing period.

If any child entered any classroom later than the first of October, they were simply not considered in the final testing.

The contaminating variables controlled were the vision and hearing of the children involved in the study. If any child had severe deficiencies in either of these areas, his or her test scores were to be excluded from the study to eliminate the contamination. There were no children in this category of deficiency, as all children were checked by a nurse with an audiometer for hearing deficiencies and all of the children also were screened for vision deficiencies by the Lazy Eye Clinic. Several were also checked by the Keystone Telebinocular Eye Test.

Method of Collecting Data

The data necessary to complete this study was obtained from the results of formal, standardized tests administered to the sample groups of children used for the study.

The tests for reading ability were the Durrell Analysis of Reading Difficulty, which is an individually administered test, and the Stanford Achievement Test, which is a group administered test.

Wilson (74:94) mentions the Durrell Analysis of Reading Difficulty as one which is "designed for use by the reading specialist for a rather complete educational analysis on a given child."

Speaking of the same test, Buros (11:835) says that it:

consists of a series of tests and situations in which the examiner may observe in detail various aspects of a child's reading. It covers a range in reading ability from the non-reader to sixth-grade ability.

Durrell (21:3-4) himself says of the test that:

the analysis consists of the following parts: oral reading tests, silent reading tests, listening tests, comprehension tests, word recognition and word analysis, visual memory of word forms, auditory analysis of word elements, spelling and handwriting.

Dykstra (22:21) discussed using the Stanford Achievement Test in a study similar to the one to be conducted for this paper. Justification for the selection of the Stanford Test for use in this study is on the basis of its considered validity when utilized by an expert in the reading field, such as Robert Dykstra.

Buros (11:466) says the Stanford Achievement Test includes "the primary battery (grades 1.2-2.5). It provides six scores: word reading, paragraph meaning, vocabulary, spelling, word study skills"

These two tests, one individual and one group, allowed for a quite broad and comprehensive comparison of scores.

The Metropolitan Reading Readiness Test was used to recognize reading potential that existed in each of the sample groups at the beginning of the first grade experience and to account for the ability differential as a variable that must be admitted to but that could not be controlled since the children had to be placed, before the test could be administered. This test is used currently by the Billings, Montana, school system and was easily implemented into the testing program for this study.

Buros (10:195) says that the Metropolitan Reading Readiness Test is used at the end of kindergarten and for first grade entrants. It includes four scores related to reading readiness, in addition to number readiness and an optional "drawing-a-man" test. Buros (10:195) says of the test that it indicates "a general high level of excellence and careful workmanship, both with respect to item construction and statistical analysis." Since it has only four scores that could be related to reading, only these four scores were used as a comparison of adjusted means in the analysis of covariance statistical treatment. These four test scores used for the purposes of the study were; listening, matching, word meaning and alphabet.

Due to the number of pupils involved in the study to be tested with individual tests, a two-week period of time for testing was

reserved. The final tests were administered in April, which allowed all of the classrooms to have been exposed to the teaching methods in reading, which are being compared, for a minimum of seven months. To control this variable of the length of time to which the groups are exposed to the control or the experimental method, the testing for the various groups was alternated; i.e., on the first day of the two-week testing period an equal number of children from each classroom were tested. This procedure was used in like manner for each of the ten school days in the two-week period. This insured that each classroom had an equal number of children tested on each of the days of the testing period, so no one room began testing later than any other, nor did any room complete testing prior to the tenth day.

Students from Eastern Montana College in Billings, Montana, administered both the Durrell Analysis of Reading Difficulty and the Stanford Achievement Tests. They underwent training in the testing procedures as a group to insure consistency in training, thus reducing this potential contamination.

Statistical Hypothesis

The first step in the statistical procedures was the statement of the null hypothesis (H_0) and the alternative hypothesis (H_1), which were tested. The null hypothesis is that: There is no significant difference (H_0 is that $M_1 = M_2$) between the mean scores on the reading

subtests when comparing the group taught with the experimental method with the group taught with the control method.

The alternative hypothesis is that: There will be a significant difference (H_1 is $M_1 \neq M_2$) between the mean scores of the reading subtests when comparing the group taught with the control method to the group taught with the experimental method.

Analysis of Data

The preliminary procedures involved in determining the initial similarity of the two classes taught by the Scott-Foresman method and the two classes taught by the Lippincott method were described in the limitation section of this chapter. The groups were matched, as closely as possible, on the basis of age and sex. The socio-economic strata of the areas in which the schools were located was another factor to be considered in the matching of pupils included in the sample groups. This factor was considered and the data presented in Table I of Chapter 1. Table I illustrated that the two areas were approximately similar in terms of socio-economic composition with regard to the three major groups of high, middle, and low stratifications.

A comparison of the mean of the group taught by the experimental method (Lippincott Program) in each subtest of both the Durrell and Stanford Tests with the mean of the group taught by the control

method (Scott-Foresman Program) in each subtest of both the Durrell and Stanford Tests was statistically conducted using a one-way experimental design. An analysis of covariance technique was used since the reading ability of the first grade children could not be controlled prior to the beginning of the study.

As a result it was deemed necessary to control this variable statistically. That is, this uncontrolled concomitant variable was adjusted in the criterion means for the two treatment groups. In this regard Lindquist (45:317) says that:

In situations in which experimental control of a concomitant variable may be either impossible or impracticable, it is sometimes possible to resort to statistical control of that variable. That is, observations may be made of the uncontrolled concomitant variations and appropriate adjustments may be made in the criterion means for the various treatment groups, as well as in the error term used in the test of significance. This method of statistical control is that known as the method of analysis of covariance.

Lindquist (45:325) continues:

It should be noted that the method of covariance is worthwhile (assuming a correlation between X and Y) even though the X means are identical for all treatment groups, in which case no adjustments would need to be made in the Y means. Nevertheless, in-groups variance of the adjusted measures would be less than that of the unadjusted measures, so that the precision of the experiment would be increased.

The choice of the analysis of covariance technique hopefully will enable the writer to compare the means of the two variables:

M_1 , the experimental program and M_2 , the control program, of teaching beginning reading.

An attempt was made to cause the sample groups in the study to be as similar as possible. An assumption was made that the sample groups came from a similar population. The size was similar in each of the groups, the sex means similar for each group, the age means similar, and the socio-economic factors were also comparable.

The uncontrolled concomitant variable (pre-school experiences) was measured by the use of the Metropolitan Reading Readiness Test (X) and is referred to as the covariate.

The two dependent variables (the achievement results derived from Method 1 and Method 2 (Y) were measured by the Durrell Analysis of Reading and Stanford Achievement Test.

The null hypothesis of no difference with the level of significance set at .05 was used to test the theory that no significant difference would be detected between M_1 and M_2 .

PROCEDURE FOUR

The fourth procedure will be to submit the data gathered in table form and analyze this data so that inferences, conclusions and summaries may be made.

PROCEDURE FIVE

The fifth procedure will be to make use of the information gathered in the review of literature and from the data gathered to offer conclusions and summaries pertaining to the study.

A summary of the study, based on this review of literature and data, will also be made.

SUMMARY

The procedures used in the study were discussed in this chapter. The first procedure was to establish a working definition of the reading process.

The second procedure was the development of the experimental design for the study. The design was to compare one method of teaching reading to beginning first grades (the experimental, or Lippincott, reading program), referred to as Method 1, with another method of teaching beginning reading (the control, or Scott-Foresman, reading program), referred to as Method 2.

The sampling procedure was the selection of two sample groups; one from Grand Avenue School, comprised of two classrooms of first grade children and one from Rose Park School, also comprised of two classrooms of first grade pupils. The population was the total number of first grade pupils in the Billings, Montana, Public School System.

The third procedure was the Review of Literature. This review will deal with early childhood socialization, the ability of the child, the code-emphasis method of teaching reading, and the meaning-emphasis method of teaching beginning reading.

The limitations of the study were also discussed and were determined to be:

- (1) a small sample
- (2) the unequal age and experience of the teachers and the variability of teacher methods of instruction
- (3) the two teaching methods tested were not completely polarized; there was overlap
- (4) The inability to control the pre-school experiences of the children in the study
- (5) The research was conducted at only two libraries
- (6) the varying philosophy of the two principals concerning supervision of instruction was not entirely the same
- (7) the attempt to control the time that each group had reading instruction might not have been completely successful
- (8) the age categories of the children were not completely proportionate
- (9) the sex categories of the groups were not completely equal
- (10) the consideration given to the test results of children

entering school after the first of October and attempts to control the contaminating variables of vision and hearing might bias the results of the study.

The fourth procedure will be to submit the data gathered in table form.

The fifth procedure will be to use the information gathered from the data and the review of literature to offer conclusions and recommendations, with a subsequent summary of the study.

The review of literature will be presented in Chapter 3.

CHAPTER 3

REVIEW OF RELATED LITERATURE AND RESEARCH

Teachers and school administrators spend a great deal of time discussing and thinking about how children learn to read and attempting to identify effective methods to use in their particular classroom. In this review of literature, which was conducted for the purpose of creating a background for the study, the resources related to the teaching of beginning reading by both code-emphasis and meaning-emphasis methods are presented.

The review was conducted, first, with the desire to describe some of the factors that are endemic to a child's reading ability, and secondly to further clarify a definition of both the terms code-emphasis and meaning-emphasis. Thirdly, the review was designed to investigate current philosophy in these two areas of methodology.

The chapter is arranged according to the following topical format: (1) literature and research related to the early socialization of the child and this environmental impact upon reading, (2) the ability of the child and the relationship of this factor to successful reading, (3) literature and research concerning the teaching of reading using the code-emphasis approach and (4) literature concerning the teaching of reading using the meaning-emphasis approach.

Later references to these discussions in the Review of Related Literature and Research are made in Chapter 4 and Chapter 5 of this

paper.

EARLY SOCIALIZATION OF THE CHILD

Chapter 1 of this paper described the act of reading as a very complex and sophisticated process. In fact, reading involves both physical and cognitive processes. Somewhere along the continuum from preparing to read to the mature application of the reading process to the solution of problems encountered in daily living, the human organism must apply both decoding and comprehension ability. Heilman (39:10-11) says that, "Learning to read is a long-term developmental process and . . . early in the learning process, the child must acquire independence in identifying words, whose meanings are known to him."

This continuum itself is a long, continuous and involved process. What occurs for each individual child in the learning process appears to be a matter of empirical, social conjecture. A tangential form of sociology, represented by the symbolic interactionists, does much to explain early childhood socialization. This symbolic interaction is explained by Rose. Rose (54:3) quotes Blumer and says that-"Man lives in a symbolic environment and that he uses symbols before he talks."

This concept takes into consideration the total conceptual environment of an individual as an organism from birth to death. Rose quotes Park and refers to this concept of socialization when he

mentions that man is not born human. The interactionists posit that the socialization of a prelingual child occurs as the baby acts randomly on a trial and error basis, then gradually, through interaction with parents and other socializing agents, becomes aware of the relationship between acts and symbols. Finally the child uses meanings to designate what is on his mind.

The symbolic interactionist contends that man is an object to himself--an object whose meaning to himself and others can only be derived from the system of social objects in which he is enmeshed.

Rose (55:3-19)

The individual child, then, is in a continuous state of development. As he proceeds through life's experiences, he acquires, in each stage of development, the characteristics which he will use in each successive stage of this development. Lindesmith and Strauss (44:257) note that:

A major consequence of children's linguistic socialization is that they become implicated in increasingly wider systems of social relationships. Confined at first to the simplest kinds of social relationships, they gradually develop the capacity to participate in complex social structures.

Blocher (7:46) tells us that "development is a lifelong set of psychological, social, and physiological processes that encompass the entire pattern of human existence. . . ."

Blocher (7:49) continues and suggests that:

The human infant at birth is in one sense a bundle of potentialities. . . .In spite of this amorphous and plastic tendency, however, in the first three years of life, the infant emerges into separateness and individualization in a way that lays down the foundation for his entire subsequent development.

These experiences with which he is confronted, and the other individuals with whom he interacts, possibly affect the child as he comes to the reading experience in the first grade situation.

Rogers (53:23) mentions that "for me, the highest authority, the touchstone of validity is my own experience." Kneller (43:59) states, from his existentialistic, phenomenological perspective, that knowledge "originates in, and is composed of, what exists in the individual's consciousness and feelings as a result of his experiences."

Even though Kneller (43:49) says, "There are no antecedent principles or purposes which can shape our destiny (Sarte's doctrine of existentialism)," there appear to be many dramatic and even less than dramatic factors which are endemic to the growth processes of the individual child. In fact, Morris (49:104) says that:

so much of what other animals must laboriously learn for themselves, we acquire quickly by following the example of our parents. . . .much of what we do as adults is based on this imitative absorption during our childhood years.

Children learn for themselves, but the social, psychological and physical environment created for them and in which they are an interacting entity destine what they become. Blocher (7:91) attempts to define a child's interaction in the primary groups. He says:

Primary groups are those groups in which an individual experiences deeply personal, face-to-face contacts and relationships. These include the family, playgroups, neighborhood groups, classroom groups or church groups. Many of the early socialization experiences of the child occur in such primary groups.

An individual child's composite experiences which mold him are very difficult to measure in retrospect. Barret (3:15) attests to this nebulous aspect of measurement when he says, "The inner depth of the psychic life . . . cannot be measured by the quantitative methods of the physical sciences."

Skinner (61:4) suggests that he feels the behavioral sciences have not become as accurate in measuring human behavior as the physical sciences have become in measuring events and procedures in the technological domain. He says:

Human behavior is a particularly difficult field . . . because we are so inept in dealing with it . . . But modern physics and biology successfully treat subjects that are no simpler than human behavior. . . . The difference is that instruments and methods they use are of commensurate complexity.

This brief background gives some small post-explanation, in behavioral terms, to the discussion in Chapter 1, concerning how a child's response in the first year of school is to a great degree predetermined by his environment.

Evidence in the literature thus far indicates that what occurs in the child's formative environment does have a definite impact on the type of reading success that he experiences in school. Other factors in the determination of the child's ability to read are

considered next.

MEASURING THE CHILD'S ABILITY

Rude's (56:572) concern with Bruner's remark that "any subject can be taught in some intellectually honest form to any child at any stage of development" could be used as a focus on this section of the paper. Despite the environmental impact, one would seem to have difficulty in teaching anything to any child if the child does not have some positive genetic inheritance, or if brain damage and birth trauma have inhibited a child's intellectual development. Genetic patterns do, however, develop and are subsumed under the environmental rubric. This concept does have a direct relationship to the reading process. Before a child can read, he must develop a vocabulary, linguistic patterns and a learning style based on pre-school cultural experiences that are different--as in the case of Hockman's (41:581) reference to the dialects of Black urban children in Chapter 1. On this basis, then, reading is the facilitation of language and is a linguistic performance, which entails verbal ability. The acquisition of verbal ability to the degree necessitated for learning to read could demand a commensurate level of what is called intelligence. Bannatyne (1:73) states that "verbal ability is an inherent and major part of intelligence and as such . . . must have an inherited basis."

Chomsky (15:4) also says that "in the technical sense,

linguistic theory is mentalistic, since it is concerned with discovering a mental reality underlying actual behavior."

One of the difficulties, however, with assessing a child's ability to read in terms of any measure of that intelligence, is in the selection of the measuring instrument. Generally speaking, the intelligence of a child, with a sense of predictive forecasting as to whether or not he is ready to read or can read, for that matter, is manifested by the use of the readiness test at the first grade level.

The problem of attempting to measure a child's ability to learn to read is in the actual definition of what factors contribute to the over-all intelligence. In other words, what facets of intelligence are necessary for the successful reading process? Heilman (38:116) tells us that:

on the whole, readiness scores alone lack precision in predicting reading achievement for individual pupils. In general, though, the experimental data indicate a positive relationship between scores on readiness tests and success in beginning reading.

In the past, it was concluded that a mental age of six and a half years was a proper minimum in pupil attainment on an intelligence test to insure beginning reading success. Heilman (39:31-33) says, however, "Authorities do not agree as to the minimum mental age which should be attained before beginning reading." To further complicate this controversy, Davidson (16:74) mentions that:

Dolch and Bloomster conducted a study of mental age and phonic achievement. They found . . . that children of high mental age might sometimes fail but children of low mental age are certain to fail.

Intelligence or cognitive skills would seem to be a criterion for success in reading. At least, if we assume that to learn to perform any functional activity in society presupposes that some form of intelligent functioning occurs. Jencks (42:53) tells us that cognitive skills means the "ability to manipulate words and number, assimilate information, make logical inferences, and so forth." Frandsen (25:110) states that intelligence is

. . . a trait determining individual differences; in school achievement, we can define it as the general intellectual capacity for learning and problem solving. Garrett says that 'intelligence. . . includes . . . abilities demanded in solution of problems which require comprehension and use of symbols.'

With the above listed definitions of intelligence, it would seem that there is some measurable factor or quality that exists to a degree in each individual pupil which should determine whether or not he can read successfully. The great problem appears to lie in the development of an instrument or test that can validly measure the intangible quotient of intelligence. Jencks (42:55) says that:

Tests are made up by psychologists and teachers so they cover kinds of information psychologists and teachers think important . . . the tests measure ability to read, understand, and make logical inferences from written material. The right answer to many of the reading comprehension questions is contained within the question itself, but this is not as obvious to some students as to others. . .

Environment of Children

Another dimension of the intelligence factor could be stated in terms of the environmental context within which a child is nurtured. In a ghetto environment, or one in which there is little stress or value placed on the acquisition of survival skills in the school milieu, what is termed as "middle class intelligence," may not develop as it would in a strata of society where these values are positively reinforced. One of the survival skills is reading and as such involves the ability to discriminate auditorily between sounds. Deutsch (17:15) says that:

Studies investigating the auditory perceptual skills of disadvantaged subjects are fewer in number, but the findings are consistent. Results indicate that subjects from impoverished environments achieve lower auditory discrimination scores than middle class subjects, exhibit poorer auditory modality functioning in comparison to visual functioning and reveal inadequate auditory perceptual skills.

In fact, Skinner (61:99) mentions that, "Things are good (positively reinforcing) or bad (negatively reinforcing) presumably because of the contingencies of survival under which the species evolved." He (61:99) continues, "as a result it is a part of the genetic endowment called human nature to be reinforced in particular ways by particular things." In other words, if skills necessary for positive school response, such as learning to read, are not stressed and emphasized in the domestic environment, they may not become part of the so-called cultural inheritance.

Even if these skills are stressed, there is some question as to whether what a child brings to school in the form of preparatory skills are immutable when he reaches the age of maturity. Jencks (42:59) says that, "The rate at which a child develops prior to the age of three tells us almost nothing about the level at which he will perform as an adult."

With the evidence that what occurs in a child's formative environment influences how a child learns to read, educators are constantly attempting to assess what type of learning environment is most conducive to the production of successful readers. Some authorities advocate the formal aspect of teaching reading to children during the pre-school years. Rude (56:572-573) mentions that:

Two distinct schools of thought prevail regarding this issue . . . the first, decrying the dangers of teaching young children to read is generally espoused by the child development experts . . . Writing about perception, Hymes states: 'Those eyes must have grown enough so they can quickly see, when they are taught, that c and e and o are different . . .' The second school of thought insists that reading instruction begin as early as possible.

In an earlier reference (1966) than Rude (1973), Durkin (19:39), in conducting a study of a comparison between children beginning the reading process early with those starting later, concluded:

There is no significant difference between the average reading achievement of equally bright early readers and non-early readers as they move through the elementary school.

Bereiter (4:7), in discussing the disadvantaged child, suggests that

early learning of any important cognitive skill is not necessarily a panacea. He says that:

Specialists in child development have emphasized for years what a slow and continuous process intellectual development is, what an enormous amount of learning and unlearning, practice, and trial-and-error goes into the smallest step in intellectual growth.

It seems evident, then, that educators face a dilemma when attempting to determine when to teach reading in the formal sense.

THE CODE-EMPHASIS METHOD

In its simplest form most authorities agree that decoding is one portion of the process of communication, with encoding being the other portion.

Smith (63:33) noted the importance of interacting sets of experience as he illustrated an example of the following communication model:

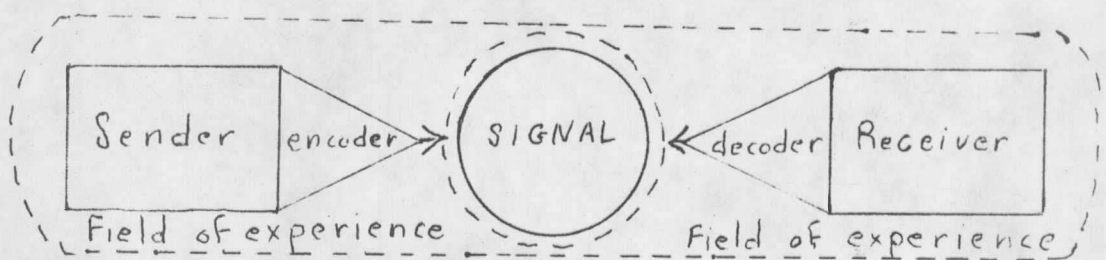


Figure 1

Verbal Level Communication

This process of communication occurs in the context of either the written or spoken dimension of expressive language. Encoding can be considered to be the formulation of either the spoken or written expression. When a speaker presents a talk, whether in the formal aspect of a speech to an organized audience or in a discussion-conversation with a peer, he can be considered to be performing the encoding portion of communication.

Linguists, according to Heilman (39:238), define language as being oral in nature. Dr. Vandiver (69) also says that "reading is a decoding process." When an author writes words in a letter or in a book, or for that matter, in any written form, with the purpose of expressing thoughts or communicating, he is performing the process of encoding. Malmberg (46:22-23) presents a linguistically scientific explanation of this process when he says:

if there is a one-to-one correspondence between written minimal units (letters) and spoken ones (phonemes) or not, it remains equally evident that the message, in its written form is manifested as a sequence of discreet elements and consequently, that if the alphabet and the spelling are as they should be, the message that reaches the sender is a replica of the form in which extra-linguistic phenomena to be communicated have been encoded in the sender's brain. The only decoding the receiver has to undertake is the discovery of the rules which, according to the language conventions, determine the relationship between the expression (the letter sequence) and the content, i.e. re-establish the sign starting from one of its halves. The reverse operation is executed when the speaker writes down his words.

Communications, then, may be either encoding or decoding, writing or reading, speaking or listening, and demands that some sort

of linguistic code be present. This linguistic code may be manifested either overtly, as the rules for the communication within a cultural context are brought into play in the cortex of the brain, or implied through the subconscious, drawing upon experiences recorded in the brain during the formative stages of the human organism's development. Communication is basically, then, an aspect of oral language. To confirm this concept, Bannatyne (1:92) mentions that, "a point that is not often appreciated in educational circles during these days of an universal emphasis upon reading and writing is that linguistic functions are essentially auditory."

This code is considered by linguists to be an element of commonality that is contained within a structure. Malmberg (46:2-3) states that linguists "start from a common outlook in that they regard the structure of language as a system--or a code--of communication, the description of which is their main concern." Chomsky (15:57) quotes James Beattie, who says:

'Languages, therefore, resemble men in this respect, that, though each has peculiarities, whereby it is distinguished from every other, yet all have certain qualities in common. The peculiarities of individual tongues are explained in their respective grammars and dictionaries.'

Words, in their cultural context, are a part of the code referred to by Malmberg and Chomsky. Words are important in the reading activities at any level and cannot be overlooked under the decoding rubric. Skinner (62:7) tells us that, "Words are regarded as tools or

instruments, analogous to the tokens, counters, or signal flags sometimes employed for verbal purposes."

In addition to the terms "code," "encoding" and "decoding," a cognitive procedure referred to as "conceptualization" is vastly important in the reading process. Malmberg (46:25) says that:

The encoding that takes place in the brain of the sender when the extra-linguistic phenomena are linguistically structured, as well as the decoding which precedes the interpretation of the message in the brain of the receiver are particular instances of a more general procedure called conceptualization, or concept formation.

Since reading involves understanding the thoughts of another person in written form, decoding is an important activity in the process. As an important portion of the reading process, understanding, then, is also important in the beginning-to-read process.

It must be realized, however, that before actually learning to read, the child must learn the language of his culture or environment. This "learning the language process" is very complicated and can be related to the environmental factors that comprise a child's pre-school development. Lindesmith and Strauss (44:233) say that,

The learning of language is not merely a matter of mastering the mechanics of speech. The symbols that make up a language are concepts, and represent ways of acting and thinking. The infant must learn to classify objects and to act appropriately toward them. He must also learn that some words refer to things that do not exist as material objects, but only as ideas, abstractions, or relationships.

Chomsky (15:25) further explains,

To learn a language, then, the child must have a method for devising an appropriate grammar, given primary linguistic data. As a precondition for language learning, he must possess, first, a linguistic theory; that specifies the form of the grammar of a possible human language, and, second, a strategy for selecting a grammar of the appropriate form that is compatible with the primary linguistic data.

These factors involving learning language are apparently, then, determined by the time the child comes to the first grade. Much of this process is inherent in the immediate linguistic environment of the child and perhaps is acquired through subconscious assimilation. Some language learning perhaps is completed through deliberate manipulation of the child's experiential background, according to Lindesmith, Strauss, and Chomsky in the preceding paragraphs. In either case, subconscious assimilation or manipulated experiential background, the child becomes aware of language bearing clues.

Returning to the idea that decoding is important, Harris (37:311) supports Chall's contention, mentioned earlier, that decoding, at the beginning stages of reading, is more important than gaining meaning as he says, "in the early stages of reading instruction, decoding should be stressed and comprehension should be soft-pedaled. This point of view is not new, but has received support from some linguists;"

An explanation of the term, "code-emphasis," is appropriate at this point to enable the reader to understand the following section of

the paper. Chall (14:75) says that the code-emphasis proponents "believe that the initial stage in reading instruction should emphasize teaching children to master a code--the alphabetic code." She (Chall, 14:346) indicates that a code-emphasis and synthetic reading approach are synonymous in that "a synthetic approach (from parts to wholes) teaches letter-sound relationships first and then teaches the child to combine these to form words." A method of decoding is emphasized rather than placing an emphasis upon obtaining meaning at the initial stage of teaching a child to read.

The code-emphasis process, then, exposes the child in the reading readiness stage to a confrontation with individual letters of the alphabet rather than expecting the child to gain readiness for reading through visual and kinesthetic experiences with concrete objects. Chall (14:159) says in regard to these visual, auditory, and kinesthetic readiness experiences that, "pointing to and naming a letter, or writing at an early age is quite different from pointing to or drawing a picture of a cat, a truck, or a tree."

The code-emphasis method of teaching reading has been associated with what has been referred to as phonic instruction. Heilman (38:245) says "the term code-cracking, as it is used extensively today, is simply a synonym for phonics."

The sounds of the individual letters are learned and the letters are then synthesized into whole words. The whole words are then

synthesized into meaningful sentences as the stages of sequential instruction in the reading process are developed. The gaining of meaning is not sacrificed for emphasis upon the decoding process, for the act of reading, in the code-emphasis context. The sequences of instruction that follow the initial stage of the reading process concentrate upon obtaining meaning as well as continuing an emphasis upon the decoding skills.

Heilman (38:245) mentions that:

The purpose of phonics instruction is to help the child develop the ability to work out the pronunciation of printed word-symbols which at the moment he does not know as sight words. Phonics instruction in early reading does not focus on teaching the child how to pronounce words, but rather that printed letter-combinations represent a word he already knows and uses in his oral language Learning word analysis skills, including phonics, is an absolute necessity for learning to read. No child will learn to read, at what might be designated as fluent third grade level, unless he has mastered a number of insights into cracking the code.

This code-emphasis, phonic approach to the teaching of reading uses, as we have seen, certain language bearing clues. Davidson (16:191) tells us that:

. . . the language bearing clues use knowledge of syntax, the structure of sentences as aids in word recognition . . . There are a number of examples of language bearing clues. One such aid is the noting of phrases which may serve as a clue in the recognition of modified unknown words. Another such aid is the recognition of unknown words, through referral signal words such as these and some, which, referring what has been previously stated.

Davidson (16:103) also mentions ways that "most modern authorities of reading advocate the teaching of phonics in some form. The

consensus is that children need visual and auditory clues in word recognition. Phonics is one of the helps in providing these clues."

After the clues to phonetic recognition of letters and words are successfully learned, next in the continuum of reading skills is forming the words into phrases and sentences. Davidson (16:191) also states that:

another group of clues involve how sentences or paragraphs are organized. Within this group are such aids as the realization that an unknown word is part of a series of words and an appreciation of the relatedness of main ideas to details, of questions to answers, and of course to affect within sentences or paragraphs.

Jeanne Chall (14:307) has done much recent research in terms of improving the teaching of beginning reading. As a result of this research, Chall suggests that a code-emphasis approach has attributes which would support its use (but only initially) in the beginning stages of teaching reading. She states, "Nor can I emphasize too strongly that I recommend a code-emphasis only as a beginning reading method. . . ." She (Chall, 14:307) continues

A code-emphasis method - i.e., one that views beginning reading as essentially different from mature reading and emphasizes learning of the printed code for the spoken language produces better results, at least up to the point where sufficient evidence seems to be available; the end of the third grade.

When children are beginning the learning-to-read process there seems to be much agreement that some type of code-emphasis is necessary, beginning with simple perceptions of differences in letters and

going on to more sophisticated discrimination between graphemes and phonemes. Nodine and Hardt (51:10) stated that the "ability of children to differentiate among letters of the alphabet has been shown to be an important prerequisite for learning to read." They (Nodine and Hardt, 51:10) go on to say that

. . . once the beginning reader masters the task of letter discrimination, he must next learn to recognize words by associating letters and letter combinations with their appropriate speech sounds.

Carl Bishop (5:215) corroborates the statements of Nodine and Hardt when he says that "a knowledge of graphic-phonetic relationships among units of smaller-than-whole words is necessary for transfer of reading to new words."

An older reference, (1941), but in agreement with the preceding authors in terms of the necessity of learning letter names is Durrell (20:6), who states that good auditory perception does not guarantee good progress in reading. He says that:

. . . if the child is weak in visual discrimination of letters and words . . . if he cannot tell m from n (he) is likely to confuse mice and nice, even though he notices differences in their sounds.

Therefore a child should be able to tell one letter from the other.

Rosner (55:3) gives further impetus to teaching beginning reading by the phoneme-grapheme concept as he says:

Learning to read, regardless of instructional method, necessitates the establishment of visual-vocal equivalences. To progress beyond a very limited sight vocabulary level, the child must

acquire the discrete equivalences represented by grapheme-phoneme interrelationships. He must discriminate and relate visual symbol to its phonetic counterpart and produce the latter in organized, connected sequences. The ability to analyze spoken words as a series of joined individual sounds is not ordinarily given consideration in the classroom, although it is implicit in the production of organized phonemic sequences.

Referring again to Rosner (55:3), he says that, "'Although reading undoubtedly is dependent on the presence of many skills, the ability to analyze verbal acoustic information seems critical to competency.'"

Bannatyne (1:311), in a reference to Chall's clinical evidence, that a code-emphasis is the better way to start reading and that the code-emphasis and a phonic method are related, says that "by a code-emphasis she (Chall) means, of course, the use of phonic methods of teaching reading."

These statements by other authors in the field of reading reinforce Chall's findings that teaching of reading by a code-emphasis yields more discernible results than does teaching beginning reading by a meaning-emphasis program.

Chall (14:158)^c also indicates that the use of a systematic code-emphasis method of teaching reading is more important than the inherent potential and language background of the children. She says that the "importance of letter and letter-sound knowledge . . . appear to be more essential for success than high intelligence."

Dykstra (22:20) confirms Chall's position in proposing that,

from the very beginning of the reading program, the pupil taught by mastery of the alphabet-code process achieves superior results in reading measured at the end of the second grade. Dykstra (22:20) tells us that:

All of the performance measures (Gates-McKillop Reading Diagnostic Test, Fry Phonetically-Regular Word Test and the Stanford Achievement Test) at either testing point favored the code-emphasis, phonic-first program. Code-emphasis pupils were superior in word recognition and comprehension skills involved in silent reading after one and two years of instruction.

Bliesmer and Yarborough (6:495), in comparing ten different beginning reading programs in first grade, stated:

It would appear, therefore, that beginning reading programs which give attention to sound-symbol relationships prior to teaching of words, or which involve a synthetic approach initially (pupils actually building words from sounds), tend to be significantly more productive in terms of specific reading achievement in grade one than do analytic reading programs which involve the more conventional approach of going directly from readiness procedures (using pictures) to the reading of whole words before either letter names or the sound the letters represent are taught.

Various advocates of the linguistic concept of teaching reading also promoted the use of a code-emphasis approach in their teaching procedures. Bloomfield and Barnhart (8:6) offered a method of teaching reading whose central thesis was:

that an inseparable relationship exists between the words as printed and the sounds for which the letters are conventional signs and that to convert letters to meaning requires from the start a concentration upon letter and sound to bring about as rapidly as possible an automatic association between them.

Relationship of
Linguistics, Phonics and Code-Emphasis Programs

The linguistic concept of teaching reading is very definitely related to the phonic method and code-emphasis method of teaching reading. Skinner (62:21) says that:

Standard linguistics units are of various sizes. Below the level of the word lies roots and affixes or more rigorously the small meaningful units called morphemes. Above the word come phrases, idioms, clauses, sentences and so on. And one of these may have functional unity as a verbal operant.

Burns (12:35) tells us that:

In brief, linguists state that a language is made up of basic units of sound called phonemes, such as "s" in sing. Phonemes are the smallest usable units of speech sound. Phonemes are built into morphemes which consist of phonemes used in sequence to form larger working units. Morphemes are indivisible language elements and are the basic meaning-bearing units of language. A free morpheme is a morpheme which can be used by itself. For example, sing. A bound-form morpheme, such as er, must always be bound to another morpheme. For example, singer. Morphemes, in turn, are put together into patterns of syntax. Syntax refers to the patterning of morphemes into larger structural units.

This description of language from the linguist's perspective relates well to the phoneticist's point of view. In the vocabulary of phonics, we have an emphasis upon the phoneme-grapheme relationship. Burns (12:41) states that:

to learn the symbol-sound correspondences rapidly and efficiently, linguists recommend that the pupil's first experiences with written words be with words which are regular in spelling (as stop). There should be one letter for one sound until it is learned. Semi-regularly spelled words (as pay) would come later; and highly irregular words (as come) would be encountered last. It is proposed that instead of controlling the words themselves, there should be control of introduction of sound and the graphic symbols for these sounds.

Savage (58:215-216) brings the linguistic, phonics, code-emphasis sense of relatedness into clearer perspective when he tells us:

And then came the linguists. They brought with them the prestige of recognized scholarship and an aura of respect generated by the very nature of their discipline. The popularity of linguistics in teaching reading was both rapid and widespread. The linguistic approach joined the parade of look-say, phonics, individualized, language experience, i/t/a, . . . One thing that all linguists agree upon is the primacy of spoken language, that speech is the first form of language and that the vast majority of children already use the spoken language by the time they are expected to learn to read.

Another area of consensus among linguists is the alphabetic nature of our writing system; that is, the individual sounds in our language are represented in writing by individual letters (called graphemes) . . . A third area of agreement among linguists is that the phoneme-grapheme correspondence in English is fairly regular. In a perfectly regular alphabetic language, there would be an exact one-to-one correspondence between sounds and symbols; that is, one symbol would represent only one sound all the time. No reading teacher needs to be told that English is not perfectly regular. We have different sounds represented by the same symbol (as the a in fat, fate, and father) and the same sound represented by different symbols (as the 'iy' or long e sound in meat, feet, and Pete). Because of these inconsistencies, it became popular to teach children to read by using whole words. Although Bloomfield called the sound-symbol relationship extremely imperfect, later research and language analysis, notably by Paul Hanna and others, has shown that English orthography is actually more regular than it is irregular. As many as four-fifths of our most frequently used words are spelled according to a regular and consistent relationship between sounds and symbols.

To further reinforce the relationship between the code-emphasis method of teaching reading and the linguistic, George (29:8-9) says that:

The linguistic approach or word family approach requires the child to make discriminations between initial, terminal, and

other phonemes within words which rhyme or words which compose a words family. The teacher might begin with a family such as the et family (et, bet, get, jet, etc.) and graduate to families such as the etch families (etch, fetch, ketch, retch, stretch, etc.). Later the child would be given sentences and stories containing words learned in word families.

This emphasis upon vowel regularity and consonant substitution is recognizably a feature of the phonic and linguistics approach to the teaching of reading. (Harris (37:312) says that, "Most linguistic and phonic series emphasize spelling patterns, which used to be called word families."

With this previously mentioned evidence that there is a commality manifested among the phonic, linguistic and code-emphasis methods, we may now proceed with more literature concerning the merits of the teaching of beginning reading with the code-emphasis method.

While several authors, i.e., Harris, Chall, Bloomfield, Heilman, et al, state their evidence that the code-emphasis is a superior teaching process, their assumptions are based on empirical studies comparing one method with the other.

The Cognitive Aspect of The Reading Process

There is some literature indicating that the means of breaking the reading process into a synthetic means of word attack and decoding is a function of the central nervous system.

To clarify and enlarge upon this complicated process of the

cognitive aspect of the act of reading, Gardner (28:64), in a discussion of "Developmental Dyslexia," suggests that children have difficulty reading "because their brains mature more slowly or are deficient in the anatomical connections needed to learn reading in the usual ways." By an observation of the complicated and nebulous reading disabilities subsumed under the rubric of the normal reading process itself, perhaps a look at the abnormal behaviors might provide some insight. Bannatyne (1:4) says, "it is a truism to say that if one wants to know a great deal about normal functioning in any aspect of life, it is extremely rewarding to examine the abnormal."

In relating this to the synthetic code breaking of the code-emphasis method, Gardner (28:65) continues by emphasizing that children with difficulty in reading "have trouble breaking a spoken word into its component phonemes and relating them to arbitrary visual configurations on a page."

Continuing, Gardner (28:65), states that:

Orton believed that these irregularities (reading problems) held the secret to the riddle of dyslexia. He conjectured that by the time most children start learning to read, cerebral lateralization has already occurred. The term means that one hemisphere of the brain, in most cases the left . . . has established dominance over the other, usually the right.

This physiological premise that the left hemisphere of the brain controls the language function of the human organism would indicate that the reading process is a neurological one. Ornstein (52:87)

mentions that:

The left hemisphere is predominantly involved with analytic thinking, especially language and logic . . . The right hemisphere, by contrast, appears to be primarily responsible for our orientation in space, artistic talents, body awareness, and recognition of faces.

This concept is an explanation to some degree, of the reading process as a definite cognitive activity. The cognitive process could possibly be related to both the code-emphasis and meaning-emphasis methods of teaching reading. In reference to reading difficulties, Bannatyne (1:298) makes the statement that:

The principal difficulty for learning disability children is to remember which graphemes are associated with which phonemes, particularly as the orthography of the English language is so irregular.

Importance of Language Development

On the basis of the preceding review of literature, it appears that reading and language are concomitant products of both environment and heredity, with each of these influences playing a role in the development of reading skills. The significance of this is that early language acquisition, indeed language acquisition itself, is important to educators who are interested in the teaching of reading.

Wanat (72:43) states that:

The study of language development (also referred to as developmental psycholinguistics or developmental linguistics or the study of language acquisition) tries to account for how the meaningless cooing, gurgling, and babbling sounds made by the infant turn

into meaningful language spoken by the adult. This field is important to reading specialists because some theorists (notably Eleanor J. Gibson) maintain that competence in the spoken language is an essential first step in learning how to read.

Several contemporary linguistic theorists have proposed some theories of early language acquisition which have some importance to the teaching of reading, if indeed, as the literature appears to indicate that there is a relationship between language development and learning to read.

Wamat (72:44) again tells us that:

Noam Chomsky of M.I.T. claims that language acquisition is a process in which the child formulates a theory (description) of the structure of his language. It is as if the child were a linguist writing a new grammar, but Chomsky qualifies his claim by saying that the child's grammar formulation is intuitive, and that the child is probably not even conscious of the rules he formulates. Some of the skills which underlie language development are: the mental ability to deal with the work, the ability to remember things, the ability to break down the language one hears into units of sound and units of meaning and recombine these units, and the ability to generalize.

Another concept promulgated in language development is the behavioristic theory. Wamat (72:44) again summarizes this behavioristic theory, when he says:

Following B. F. Skinner's view, the acquisition of language is based on rewarding the child when he imitates or tries to imitate models of adult language. There has been much discussion about the nature of the reward or reinforcement and about the stimulus--the thing that brings about the response from the learning . . . The imitation of models that the child hears and the frequency with which he hears these models are key concepts in behavioristic theory.

Of course, the implications of the behavioristic theory of

language development could obviously be adjusted to and utilized with any method of teaching reading, whether the meaning-emphasis or code-emphasis method.

In terms of the behavioristic concept, some type of reward or punishment is perhaps essential in any type of learning process. Seligman and Hager (60:59) say that:

Learning theorists, when they study classical conditioning thus tend to believe that what an animal learns about is relatively unimportant. They believe that virtually all stimuli responses and reinforcement can be paired, equally well, if they but use correct techniques. Moreover, we have general laws that describe the acquisition, inhibition or extinction of such pairings. We can teach a pigeon to peck for grain as easily as we can teach a rat to run for water and as easily as we can teach a child to smile for approval. The underlying psychological laws are the same for all three behaviors. This belief--the equipotentiality premise--is the foundation of all mainstream learning theory today.

It is rewarding and perhaps important for teachers of reading to understand something of the contending, contemporary learning theories. It is well to mention these theories of learning, so that all perspectives may be examined in an attempt to apply them to the teaching of beginning reading using either the code-emphasis or meaning-emphasis methods of reading.

Yet another theory is referred to as the Nativistic Theory.

Referring again to Wanat (72:45), he mentions that,

Very briefly, the nativistic position holds that language development is related to the growth of the human brain, and that maturation in language parallels maturation in motor and thinking skills. While the behaviorists emphasize outside events, nativistic

theory concentrates on what is inside the child.

Both neurological and psychological constructs can shed some light on the learning process involved in the "learning to read process." It is through the learning principles based on these constructs that prompts Bannatyne (1:209) to say that:

Obviously most concepts are multisensory in nature and will therefore be stored in a number of the secondary areas found in many parts of the cortex. However, more time-connected and communicative auditory concepts are likely to be stored in the interpretive cortex, whereas visual material of a precept-concept nature is likely to be stored in the secondary areas of the occipital lobes.

The process of reading is a behavior and as a behavior must be considered in the viewpoint of an active process. This active process then, does relate to the physiological and psychological contexts of cognitive function.

In speaking of the word behavior, Skinner (52:20) says:

What is needed for present purposes and what the traditional words occasionally approximate is a unit of behavior composed of a response of identifiable form functionally related to one or more independent variables.

In returning to the more mundane, but functional thinking related to the teaching of beginning reading, Mrs. McMillion, a Livingston, Montana, first-grade teacher, provides some subjective support for the code-emphasis method of reading instruction. In an observation of her first-grade class at work and in a subsequent interview, Mrs. McMillion (48) stated that the linguistic series she was

using as a pilot program provided the children with a greater degree of word attack skills than was displayed by groups of children she had taught in previous years with the meaning-emphasis methods included in the meaning-emphasis basal reading series.

Effectiveness of Code-Emphasis Procedures

Even though much evidence would seem to support the use of code-emphasis methods, there is much criticism of Bloomfield's linguistic method (based on a code-emphasis process), which uses regularly spelled words in rhythmic sequence. Sullivan (67:2) places Bloomfield and Barnhart's prototype linguistic series in a ludicrous category, yet he admits that:

However, the subject of linguistically oriented approaches to reading did take on a different light as I noted that Jeanne Chall concluded: 'My analysis of the existing experimental comparisons of a meaning-emphasis versus a code-emphasis tends to support Bloomfield's definition that the first step in learning to read in one's native tongue is essentially, learning a printed code for the speech we possess.'

To further substantiate the merits of the code-emphasis method of teaching of beginning reading over those of the meaning-emphasis method, Hartlege (36:1) says, in reference to an investigation or study of three groups of children at the beginning stage of the reading process, that:

Three approaches to initial reading instruction were evaluated to determine their relative effectiveness in establishing word recognition skills. Significant differences between

the three groups of children were found in their post-test scores.

A special alphabet approach produced highest scores, a phonic approach next highest; and look-say approach produced lowest scores.

Vanesky (70:16) says that "In a study of the reading and reading-related skills of 1,172 first grade children, letter naming ability in September correlated highly with oral reading ability in February."

Since letter naming ability is a pre-requisite, as noted before in this review, to a code-emphasis method of teaching reading, it could be inferred that this facet of the code-emphasis method helps sustain the reading achievement level of children who were subjected to this method of teaching.

THE MEANING-EMPHASIS METHOD

The literature is clear with regard to the fact that whatever the method used in the teaching of beginning reading, there must be some visual-auditory relationships involved. To repeat a quote made earlier in this paper, Rosner (55:3) says that:

Learning to read regardless of instructional method, necessitates the establishment of visual-vocal equivalences. To progress beyond a very limited sight vocabulary level, the child must acquire the discrete equivalences represented by grapheme-phoneme interrelationships. He must discriminate and relate visual symbol to its phonetic counterpart and produce the latter in organized, connected sequences. The ability to analyze spoken words is not ordinarily given consideration in the classroom, although it is implicit in the production of organized phonemic sequences.

This serves to reinforce the belief that in either method of teaching reading, (code-emphasis or meaning-emphasis), a certain graphemic-phonemic relationship is desired.

Emans (23:477-478) says that:

Phonics is actually not a method for teaching beginning reading; it is a goal: to give children the ability to associate oral and written language. Look-say can also be accurately described as a goal: to have children recognize words instantaneously. Within either phonics or look-say there are many and varied teaching methods.

The meaning-emphasis method of teaching reading stresses obtaining meaning from the printed page at the onset of the reading process. Deriving meaning from the printed symbols takes precedence over the mechanics of learning a code to unlock the words even at the initial stages of the beginning-to-read process. This emphasis upon meaning is stressed at an earlier stage in the learning to read process in the meaning-emphasis procedure than with the code-emphasis procedure.

The meaning-emphasis method of teaching reading stresses reconstructing meaning from the printed page at the on-set of the reading process. In discussing the contrast between the code-emphasis and the meaning-emphasis methods of teaching beginning reading Chall (14:75) says:

One group (let us call it the code-emphasis group) believes that the initial stage in reading instruction should emphasize teaching children to master a code--the alphabetic code. The

other (the meaning-emphasis group) believes that children should, and do, learn to read best when meaning is emphasized from the start.

Emphasizing Meaning

In support of the concept of stressing comprehension, Harris (37:311) tells us that, "A second trend in objectives is increased attention to critical reading and to the development of creative thinking through reading." Chall (14:34), in turn, says that "an analytic approach (from wholes to parts) teaches these relationships [critical reading and comprehension] through analysis of known sight words."

It is the writer's interpretation that the meaning-emphasis method is synonymous with the analytic method for the purposes of this study, as related to critical reading and comprehension.

Fay (24:162) says that in a meaning-emphasis program,

. . . emphasis for the beginning reader is upon meaning. The child memorizes a basic sight vocabulary and on the basis of these is directed to the study of phonetic analysis, structural analysis, word form and context clues.

Davidson (16:103) corroborates this statement of Fay, when she says, "many words in the primary years are learned by sight because authorities recognize that many of the common, basic words do not reflect phonic generalizations."

Again, in this regard, it would seem that in the beginning stages of reading, using the meaning-emphasis method, meaning and an

introduction to an initial sight word vocabulary are related. The aspect of gaining meaning is stressed first, then from the sight word (a word memorized by its shape or configuration), the phonic philosophy of phonetic analysis and structural analysis attack skills are applied in an analytic procedure (from wholes to parts). The meaning-emphasis programs currently stress confronting the children, in the beginning stages of reading with the letter names and sounds of the alphabet, as do the code-emphasis programs. The difference in the two approaches is a quoted from Heilman (39:244) (as he discusses the code-emphasis process): "Prior to working with words, the child . . . should learn to identify (name) the letters of the English alphabet."

In none of the literature that was reviewed, is there a statement that the meaning-emphasis proponents overtly require a systematic procedure for learning the letters of the alphabet as a prerequisite to the reading process.

The meaning-emphasis method then, stresses the memorization of the configuration of whole words, rather than extreme emphasis upon the individual letters and the phoneme-grapheme relationship, in terms of sound, as does the code-emphasis method.

Procedures Involved in Meaning-Emphasis

To illustrate this whole word approach, Davidson (16:9) points out that there are various steps which are integral to the beginning

reading process in the implementation of the meaning-emphasis, sight word process. She states that, according to this method, the principles of teaching word recognition are to:

. . . proceed from the familiar to unfamiliar associating a name with a picture of an object . . . first tell a student the whole word, then give hints, and finally let the student figure out the word from a variety of techniques he has learned.

Davidson (16:10) tells us that, after a child has been taught words with the beginning "r" consonant such as red, run, and raw "the phonogram, ight is taught through such words as light, fight, and might. By substituting the initial consonant 'r' he (the child) would get the word, right."

As was mentioned in the preceding literature, the code-emphasis process uses the phonic concept and also so does the meaning-emphasis process.

Davidson (16:30) points to the relationship between this use of phonics to the meaning-emphasis method when she says:

Consider the ways a child learns to recognize and identify a word. There are four major areas to be considered as far as instruction in word recognition is concerned: (1) context, (2) phonetic analysis, (3) structural analysis, and (4) comprehension.

To describe the phonetic analysis process Davidson (16:30-38) continues by stating that phonic analysis is utilized in "identifying likenesses and differences in beginning sounds, . . . [and] identifying likenesses and differences [of letters] in the medial position."

Davidson's description of the utilization of phonic analysis

may be related to the Scott-Foresman implementation of the meaning-emphasis procedure. Gray (33:11) says that:

In the phonetic-analysis program in "The New Basic Readers," children work first with consonant elements in the words because:

Consonants are the more stable element in our language, unaffected by accent or vowels . . .

Consonants alone provide useful phonetic clues to word wholes (ph_n_t_c cl_s); vowels do not (_o_e_i_ _ue_).

Vowel elements are taught next--by drawing children's attention to phonetic elements in words they recognize at sight

Gray (33:7) also mentions that:

In the New Basic Reading Program children are taught to look first for meaning units--root words, prefixes and suffixes--in words as a basis for unlocking them they apply phonetic analysis to determine the sounds of the syllables within the whole word.

An example of the code-emphasis procedure, as implemented in the Lippincott program is explained by McCracken and Walcutt (47:XII-XIII) when they say:

Our task is to help him [the child] hear the phonemes in the words he hears and says very well. He says fat perfectly. Beginning there, we get him to recognize, to identify its three sounds. At the same time we show him how the three letters represent these sounds

First we begin with the short vowels because they appear in every word (except the occasionally-word . . .) . . . then we go to consonants because, of course, you have to add them to vowels to make words

You will see, as you work with the system, that the steady

accumulation of new words, first in lists and then in stories (which, let us emphasize again, use only the letter-sounds that have been taught to any one point), comes as the child learns to recognize letter-sounds in words.

The key difference in phonic analysis application, then between the Lippincott (code-emphasis) and Scott-Foresman (meaning-emphasis) is that Lippincott teaches short vowels first and then consonants and Scott-Foresman teaches consonants before vowels. The next point of emphasis is that Lippincott stresses the learning of letters and their related sounds (grapheme-phoneme relationship) so that the word is recognized by virtue of its composite letter makeup.

Scott-Foresman, on the other hand, stresses phonetic elements in whole words the children recognize at sight.

Bannatyne (1:209) says:

Much of the preliminary analysis would be in terms of distinctive features and phonemes. Next, the phonemes and groups of phonemes are probably structured into simple part word units of sound and matched against existing previously experienced part-word or whole word units in an automatic sequencing decoding process which is thus far non-semantic . . . whatever the details of the neurological mechanisms involved, sounds are assembled and matched against experience.

George (29:8) refers to the analytic phonic approach and its methodology and tells us that:

In this approach the teacher begins the instruction by presenting a written word whose sound is familiar to the child. The word is pronounced aloud by the teacher and perhaps by the child. The child then, may be asked what is the first sound?

The letter combinations which represent each phoneme are identified by the teacher, the child pronounces these letter combinations as they are identified and later may be asked to pronounce them isolated from the word in which they originated.

This principle of using visual discrimination lessons built on letter forms is another fundamental and subtle difference between the code-emphasis and meaning-emphasis methods of beginning reading instruction.

Pertaining to the preparatory stages of reading, Wheelock and Silvaroli (73:115) mention that:

Readiness or preparatory lessons found in most of the major reading programs do provide lessons requiring visual discrimination. However, these lessons are not likely to be built on the letter forms used in later reading lessons but have to do with learning to discriminate pictorial forms and geometric shapes from one another.

Chall (14:159) says, in defense of the code-emphasis utilization of using letters rather than pictures in the reading readiness process, that:

The child who can identify or reproduce a letter engages in symbolic representation; to borrow a phrase from Jerome Bruner, while the child who is working with a picture of an actual object engages in iconic representation, . . . When a child engages in symbolic representation, he is already practicing a higher form of intellectual behavior.

Heilman (39:51), in discussing one facet of the readiness program for meaning-emphasis methods of reading instruction tells us that:

"Familiar pictures are found and word names are printed."

Since the principle of using letter forms for visual

discrimination exercises is one of the bases of the code-emphasis method, Samels says some doubt could be cast upon this aspect of the code-emphasis method and thus negate the total effectiveness of this process over the meaning-emphasis method. In the explanation of this doubt Samels (57:159) says,

It may be that letter name knowledge has no direct effect on reading acquisition. For example, the child entering first grade with the ability to name many letters may come from a home where academic achievement is emphasized. Consequently, the direct influence on reading achievement may be the home and not the knowledge of letter names.

In fact, Stott (66:375) carries this doubt [that letter naming is important to the beginning reading process] even further when he says,

Even kindergarten children referred to the remedial center as slow learners are not found to have an intrinsic difficulty in distinguishing the letters of the alphabet. Nearly all failure to match letters is due to inattention.

These statements could have some ramifications inasmuch as they would reinforce an emphasis upon obtaining meaning in the reading process . . . meaning rather than decoding would be paramount in importance.

Douglas (18:19) attacks, with vigor, Chall's analysis of reading data in Learning To Read: The Great Debate, when he says:

Chall's findings are unclear. Indeed, in recent Norwegian experimental programs where techniques for individualizing reading are being explored, there is a definite shift to an analytic or whole word method. In the experimental classes this whole word method has so far proven to be effective; children

appear to be learning as well with the new method as with the traditional method.

This statement by Douglas is supported by Davidson (16:26), that Chall's findings are not completely valid when she says:

Although this study supports in general Chall's conclusions concerning the superiority of code-emphasis programs in beginning reading, a note of caution is in order. There is no clear evidence that early emphasis on code per se is the only or even the primary reason for the relative effectiveness of the code-emphasis programs.

Many experts consider that there are weaknesses and inconsistencies involved in the code-emphasis procedures and even that most people, in learning to read, actually learn, (despite the lip-service to the code-emphasis method) by the meaning-emphasis or whole word approach.

George (29:10) says:

The whole word approach or the look-say approach has received its share of criticism even though most words which individuals learn to read initially are learned as whole rather than sounded out phoneme by phoneme. In this approach, the child is shown a word, either in isolation or context. The sound of the word is presented with the word and the sound after the first few words are learned in this manner, it is difficult to say whether or not the child attacks new words as wholes or analyzes the grapheme-phonetic units within words by using indirectly learned graphemic-phonemic generalizations.

In discussing the inconsistencies involved with the utilization of the code-emphasis and to point this up quite dramatically, Venesky (70:9) says:

Of the 26 letters of English, 11 have at least two common pronunciations each: the vowels a, e, i, o, u, and y, which can

either be consonants or parts of vowels, (e.g., beware: dew, beyond, grey); c and g as in city, cage, gym, and game, and s and x as in sign, resign, fix, exist. Four others have lower frequency variants: d (dial, cordial), t (mat, nation), n (thin, think), and r (run, stir). Of the remaining letters, most have low frequency variant pronunciation or can be silent, e.g. as in hit and honest, z as in zip and quartz. In addition there are consonant sequences which represent single consonant phonemes, (ch, dg, gh, ph, rh, sh, th, tch) and wh which in some dialects represents a single sound and in others, two phonemes in the reversed order from the spelling.

Chall (14:301) says "most children in the United States are currently learning to read by a meaning-emphasis method." Chall (14:309) goes on to admit that:

a beginning code-emphasis program will not cure all reading ills. It cannot guarantee that all children will learn to read easily. Nor have results of the meaning-emphasis programs been so disastrous that all academic and emotional failures can be blamed on them, as some proponents and publishers of new code-emphasis programs claim.

These remarks by Chall would seem to give some encouragement to the promoters of the meaning-emphasis programs, inasmuch that children do learn to read with historically proved validity, using this method.

Although the code-emphasis proponents advocate the teaching of reading to gain meaning, this is not considered a necessary factor in the beginning stages of the "beginning to read process," even though meaning is stressed later in the developmental stages of the reading process. Harris (39:311) mentions that there are several trends in regard to reading objectives in the early stages of reading instruction,

and he mentions that the first is the insistence of some writers that "decoding should be stressed and comprehension should be soft-pedaled. This point of view is not new, but has received recent support from . . . Chall's Learning to Read."

Some reading specialists consider the code-emphasis method irrelevant and superficial due to this lack of emphasis on meaning at the first stages of the reading process. Since obtaining meaning is the objective of the reading process in its total and ultimate form, the meaning-emphasis sycophants consider the code-emphasis programs very tenuous indeed.

Pursuing the above premise, Neinsted (50:113) asks the question, "What are the meaningless sounds that the child has to manipulate if he is to learn to read?"

She continues,

Meaningless sounds do not include only nonsense syllables, but words outside the spoken vocabulary of the child, function words, or isolated sounds. Those meaningless sounds for many beginning readers are the crux of the matter! The form of language to which the child attaches meaning is sentences in context, perhaps elliptical sentences, but sentences, nevertheless.

It is said that the code-emphasis method emphasizes a structure and a code, and is not necessarily related to reading reality. Bannatyne (1:476) supports this attitude as he tells us, "When the sound (phonemic) structure of speech is disordered, the system of word meaning based on this structure must also be disordered."

Another tenet in the meaning-emphasis polemic, which manifests the antithesis to the code-emphasis method, is stated by Chall (14:96):

What is essential, however, is that Gray assumed that an early emphasis on phonics (or decoding, in our terminology) led inevitably to dull content and that it also made for mechanical, "word-by-word" reading, which impedes comprehension and enjoyment.

Gray (34:52), historically considered an authority in the field of teaching reading, felt that, "to give children real power in word perception, we must see that they master a sight vocabulary."

SUMMARY

Teachers and school administrators spend a great deal of time discussing and thinking about how children learn to read and also attempting to identify effective methods to use in their particular classroom.

The review of literature was conducted for the purpose of creating a background for the study and to present the resources that describe the teaching of beginning reading by both the code-emphasis and meaning-emphasis methods.

The review of literature was conducted with these purposes in mind: (1) To review the literature that would give some indication of the early socialization of children in an attempt to relate this early developmental period in children to the reading process in the first grade of school, (2) to explore some factors that are considered

important to the measurement of intelligence, (3) to define the terms code-emphasis and meaning-emphasis and (4) to investigate current philosophy in the areas of these two reading methods.

The literature indicated that the socialization experiences a child has, in terms of his cultural environment and the domestic milieu in which he has first social experiences, definitely shape the acquisition of language. This language life style and the language building process, was indicated by the literature, to be inextricably intertwined with reading success in the first year of school.

The environment to which children are exposed and in which they are nurtured play a great role in the development of intelligence that is functionally manifested in the reading process, again according to the literature. Generally speaking, the intelligence of a child, with a sense of predictive forecasting as to whether he is ready to read is manifested by the use of the readiness test at the first grade level.

It seems evident that educators face a dilemma when attempting to determine when to teach reading in the formal sense. A code-emphasis method of teaching beginning reading was defined as a synthetic process of reading which means teaching a child the alphabet code, attaching sounds to the letters in a tight graphemic-phonemic relationship, and the application of these skills to a decoding process of attacking the pronunciation of words and the consequent understanding

of their meaning as thoughts are expressed by an author.

Since reading involves understanding the thoughts of another person in written form, decoding is an important activity in the process.

In the early stages of reading instruction, decoding should be stressed and comprehension should be perhaps second in priority.

In the code-emphasis process the sounds of the individual letters are learned and the letters are then synthesized into whole words.

There is a definite relationship between code-emphasis and phonics. Code-emphasis includes the use of context clues and comprehension, whereas phonics includes only word analysis. The consensus is that children need visual and auditory clues in word recognition. Phonics is one of the helps in providing these clues. In addition, the linguistic concept of teaching reading is very definitely related to the phonic method and code-emphasis methods of teaching reading.

There is some literature indicating that the means of breaking the reading process into a synthetic means of word attack and decoding is a function of the central nervous system.

On the basis of the preceding review of literature, it appears that reading and language are concomitant products of both heredity and environment.

Meaning-emphasis was defined as a means of teaching beginning

reading, emphasizing the analytic process. This was further defined as fundamentally teaching sight words and then breaking these words down into the integral linguistic parts through application of phonic generalizations.

The meaning-emphasis method of teaching reading stresses obtaining meaning from the printed page at the onset of the reading process.

The principles of teaching word recognition according to the literature, is to proceed from the familiar to the unfamiliar, associating a name with an object and then let the pupil figure out the word from a variety of techniques.

As was mentioned in the literature, the code-emphasis process used the phonic concept and also so does the meaning-emphasis process.

Proponents of both methods were found to have valid evidence for the efficacy of their favorite method. Breaking the code and attacking new words in terms of this code breaking skill was favored by many experts to be highly efficient and capable of producing results.

The process of teaching familiar words as a sight word process, with an emphasis upon meaning at the very beginning was noted by many authors as having great positive merit and to be growth producing.

The key difference in phonic analysis application between the Lippincott (code-emphasis) and Scott-Foresman (meaning-emphasis) is that

Lippincott teaches short vowels first and then consonants and Scott-Foresman emphasizes consonants first and then short vowels. The next point of emphasis is that Lippincott stresses the learning of letters and their related sounds and Scott-Foresman stresses phonetic elements in whole words that children recognize at sight.

The application of this literature in terms of making inferences and supporting recommendations will be found in Chapter 5 of this paper.

The following chapter presents the analysis of data involved in the study.

CHAPTER 4

ANALYSIS OF DATA

In this chapter the writer will present and describe the results of the statistical analysis that was used to treat the raw data collected by administering the three standardized tests described in Chapter 2. The first test was the Metropolitan Reading Readiness Test, which was administered to both the group of first grade children taught by the control method of beginning reading instruction (the Scott-Foresman Program) and to the group taught by the experimental method (the Lippincott Program) during the second week of school in September, 1971.

The other two tests administered to both groups of first grade children were the Durrell Analysis of Reading Difficulty (an individually administered test) and the Stanford Achievement Test (a group administered test).

These three tests were administered, scored and the raw data were programmed, then processed by the computer in the Montana State University Computer Center at Bozeman, Montana.

An analysis of covariate statistical technique was chosen to compare the means of the two dependent variables, M_1 , the control program and M_2 , the experimental program of teaching beginning reading. These means were derived from test results taken from the Durrell Analysis of Reading Difficulty and the Stanford Achievement Tests.

The uncontrolled concomitant variable (pre-reading abilities) was measured by the use of the Metropolitan Reading Readiness Test and is referred to as the covariate.

Each of the five sub-test means on the Durrell Analysis of Reading Difficulty test (oral reading, silent reading, listening, flashwords and word analysis) was adjusted by each of the four sub-test means on the Metropolitan Reading Readiness Test (word meaning, listening, matching and alphabet). These four sub-tests may be used as a prediction of reading readiness.

Then each of the three sub-test means on the Stanford Achievement Test (word reading, paragraph meaning and vocabulary) was adjusted by each of the four sub-test means on the Metropolitan Reading Readiness Test. The three sub-tests of the Stanford Achievement Test were deemed most relevant to a determination of reading achievement. The other sub-tests were spelling and word study skills and the total score of the test. The writer felt that spelling, word study skills and the total score were not so important in determining reading ability as the first three (word reading, paragraph meaning and vocabulary), which are directly involved in the mechanics of the reading process.

Since the reading ability of the two groups (the group taught by the experimental method and the group taught by the control method) could not be experimentally controlled prior to the beginning of the

study, an analysis of covariance design was used to test for a comparison of reading achievement by controlling this variable statistically. That is, the uncontrolled concomitant variable was adjusted in the criterion means for the two treatment groups. The null hypothesis of no difference with the level of significance set at .05, was used to test the theory that no significant difference would be detected between the reading achievement of the group taught by the experimental method (M_1) and the group taught with the control method (M_2).

The collected data will be presented in table form with a subsequent narrative description. The following tables present the results of the analysis of covariance of a one-way experimental design comparing Method 1 with Method 2, using as dependent variables the Durrell Analysis of Reading Difficulty in one section of the analysis procedure and then the Stanford Achievement Test in another section of the analysis procedure.

The results of the experimental design are presented in eight tables that follow, with the results of the Durrell Analysis of Reading Difficulty, adjusted by the Metropolitan Reading Readiness Test, presented in the first five tables and the results of the Stanford Achievement Test, adjusted by the Metropolitan Reading Readiness Test, presented in the remaining three tables. Sax (59:422) mentions that, "If the F ratio is significant, it is an indication that two or more of these means differ significantly among themselves." This remark

will be used as a basis of determining whether to accept or reject the null hypothesis on all of the following tables.

Durrell Analysis
of Reading Difficulty

The first five tables (beginning with Table III) present the mean achievement of the group taught by the control method and the mean achievement of the group taught by the experimental method, as measured by the Durrell Analysis of Reading Difficulty Test. These results are analyzed by comparing the means of the two groups and are indicated by $\bar{Y}$ on the tables in the control and experimental columns. The Metropolitan Reading Readiness Subtests are noted in the covariate column and the results are indicated by $\bar{X}$ in that column.

The mean of the Durrell Analysis of Reading Difficulty, as adjusted by the Metropolitan Reading Readiness Test, is presented on the following five tables and is indicated in the $\bar{Y}'$ column.

The value of F upon which basis the null hypothesis is accepted or rejected is indicated in the F' (adjusted F value) column.

TABLE III

ANALYSIS OF COVARIANCE RESULTS COMPARING CONTROL AND EXPERIMENTAL
GROUPS ON THE DURRELL ORAL READING SUB-TEST USING THE
FOUR SUB-TESTS OF THE METROPOLITAN
(INDIVIDUALLY) AS COVARIATES

Covariate	Durrell Oral Reading						
	Control Method			Experimental Method			F'
	N = 42			N = 41			
	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	
Metropolitan Word Meaning	11.74	21.69	21.56	10.34	27.10	27.23	10.07*
Metropolitan Listening	12.29	21.69	21.71	12.22	27.10	27.08	11.05*
Metropolitan Matching**	9.07	21.95	22.13	9.39	27.10	26.92	8.78*
Metropolitan Alphabet***	11.50	21.69	22.56	12.83	27.53	26.61	7.91*

(Critical value of F, df = 1, 80; alpha = .05 is 3.96)

(*Significant at the .05 level of significance.)

**N = 41, as the computer failed to calculate one zero score as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score as a member of N in experimental group.

Durrell Oral Reading sub-test adjusted by the Metropolitan Word Meaning covariate. Table III, page ninety-seven, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Oral Reading sub-test was 21.69. When this mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 21.56 was derived.

On this same Durrell sub-test, a mean of 27.10 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Word Meaning sub-test covariate, the experimental group obtained an adjusted mean of 27.23.

On this oral reading sub-test the adjusted F value was computed to be 10.07. Since this exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method. The null hypothesis (that there is no significant difference between the adjusted means of the two sample groups) was rejected.

Durrell Oral Reading sub-test adjusted by the Metropolitan Listening covariate. Table III, page ninety-seven, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Oral Reading sub-test was 21.19. When this mean was adjusted by the covariate (Metropolitan Listening sub-test), an adjusted mean of 21.71 was derived.

On this same Durrell sub-test a mean of 27.10 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Listening sub-test covariate, the adjusted mean of 27.08 was obtained for this group.

On this oral reading sub-test, adjusted by the listening mean on the Metropolitan, the adjusted F value was computed to be 11.05. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is not significant difference between means of the two sample groups) is rejected.

Durrell Oral Reading sub-test adjusted by the Metropolitan Matching covariate. Table III, page ninety-seven, illustrates that when the Metropolitan Matching sub-test was used as the covariate, the oral reading mean obtained for the group taught with the control method (Scott-Foresman Program) was 21.95, with an adjusted mean of 22.13.

On this Durrell Oral Reading sub-test, Table III also shows that a mean of 27.10 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Matching sub-test covariate, an adjusted mean of 26.92 was obtained for this group.

When this Durrell Oral Reading sub-test was adjusted by the Matching sub-test on the Metropolitan, the adjusted F value was computed to be 8.78. Since this F value exceeded the critical value, the mean of the group taught with the experimental method was significantly higher than the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Oral Reading sub-test adjusted by the Metropolitan Alphabet covariate. Using the Alphabet sub-test (on the Metropolitan) as the covariate for the group taught with the control method, Table III, page ninety-seven, illustrates that the mean was 11.50. In adjusting the Durrell Oral Reading sub-test of 21.69 by this alphabet covariate, the adjusted mean was 22.56.

Table III also shows that a mean of 27.53 was obtained for the

group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Alphabet sub-test covariate, an adjusted mean of 26.61 was obtained for this group.

On this Oral Reading sub-test of the Durrell, when adjusted by the Alphabet sub-test of the Metropolitan, the adjusted F value was computed to be 7.91. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between the means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Alphabet sub-test as a member of N for the experimental group, thus changing the N for this sub-test from 41 to 40. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Silent Reading sub-test adjusted by the Metropolitan Word Meaning covariate. Table IV, page 102, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Silent Reading sub-test was 20.19. When this

TABLE IV

ANALYSIS OF COVARIANCE RESULTS COMPARING CONTROL AND EXPERIMENTAL GROUPS ON THE DURRELL SILENT READING SUB-TEST USING THE FOUR SUB-TESTS OF THE METROPOLITAN (INDIVIDUALLY) AS COVARIATES

	Durrell Silent Reading						
	Control Method			Experimental Method			
	N = 42			N = 41			
Covariate	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	F'
Metropolitan Word Meaning	11.74	20.19	20.09	10.34	24.98	25.07	8.98*
Metropolitan Listening	12.19	20.19	20.21	12.22	24.98	24.96	9.77*
Metropolitan Matching**	9.07	20.44	20.60	9.39	24.98	24.82	7.85*
Metropolitan Alphabet***	11.50	20.19	20.88	12.83	25.35	24.64	6.79*

(Critical value of F, df = 1, 80; alpha = .05 is 3.96)

(*Significant at the .05 level of significance)

**N = 41, as the computer failed to calculate one zero score as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score as a member of N in experimental group.

mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 20.09 was derived.

On this same sub-test, a mean of 24.98 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Word Meaning subtest covariate, the experimental group obtained an adjusted mean of 25.07.

On this silent reading sub-test, the adjusted F value was computed to be 8.98. Since this exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Durrell Silent Reading sub-test adjusted by the Metropolitan Listening covariate. Table IV, page 102, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Silent Reading sub-test was 20.19. When this mean was adjusted by the covariate (Metropolitan Listening sub-test), an adjusted mean of 20.21 was derived.

On this same Durrell sub-test, a mean of 24.98 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Listening sub-test covariate, the adjusted mean of 24.96 was obtained for this group.

On this silent reading sub-test, adjusted by the listening of the Metropolitan, the adjusted F value was computed to be 9.77. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Durrell Silent Reading sub-test adjusted by the Metropolitan Matching covariate. Referring to the Durrell Silent Reading sub-test, Table IV, page 102, illustrates that when the Metropolitan Matching sub-test was used as the covariate, the oral reading mean obtained for the group taught with the control method (Scott-Foresman Program) was 20.44 and the adjusted mean was 20.60.

On this silent reading sub-test, Table IV, page 102, also shows that a mean of 24.98 was obtained for the group taught with the experimental method (Lippincott Program). An adjusted mean of 24.82 was obtained for this group.

When the silent reading sub-test was adjusted by the Matching covariate on the Metropolitan, the adjusted F value was computed to be 7.85. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Silent Reading sub-test adjusted by the Metropolitan Alphabet covariate. Using the Alphabet sub-test of the Metropolitan as the covariate, Table IV, page 102, illustrates that the mean for the group taught with the control method was 11.50. In adjusting the Durrell Silent Reading sub-test of 20.19 by the Alphabet covariate, the adjusted mean was 20.88.

Table IV, page 102, also shows that a mean of 25.35 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Alphabet sub-test covariate, the adjusted mean of 24.64 was obtained for this group.

On this Silent Reading sub-test of the Durrell, when adjusted by the Alphabet sub-test of the Metropolitan, the adjusted F value

was computed to be 6.79. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on The Metropolitan Alphabet sub-test as a member of N for the experimental group, thus changing the N for this sub-test from 41 to 40. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Listening sub-test adjusted by the Metropolitan Word Meaning covariate. Table V, page 107, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Listening sub-test was 22.83. When this mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 22.57 was derived.

On this same sub-test, a mean of 27.15 was obtained for the group taught with the experimental method (Lippincott Program).

TABLE V

ANALYSIS OF COVARIANCE RESULT COMPARING CONTROL AND EXPERIMENTAL
GROUPS ON THE DURRELL LISTENING SUB-TEST USING THE
FOUR SUB-TESTS OF THE METROPOLITAN
(INDIVIDUALLY) AS COVARIATES

	Durrell Listening						
	Control Method			Experimental Method			
	N = 42			N = 41			
Covariate	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{F}'$
Metropolitan Word Meaning	11.74	22.83	22.57	10.34	27.15	27.41	7.35*
Metropolitan Listening	12.19	22.83	22.85	12.22	27.15	27.12	6.35*
Metropolitan Matching**	9.07	23.02	23.19	9.39	27.15	26.98	4.80*
Metropolitan Alphabet***	11.50	22.83	23.58	12.83	27.53	26.74	3.70

(Critical value of F, df = 1, 80; alpha = .05 is 3.96)

(*Significant at the .05 level of significance)

**N = 41, as the computer failed to calculate one zero score
as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score
as a member of N in experimental group.

Adjusted by the Metropolitan Word Meaning sub-test covariate, the experimental group obtained an adjusted mean of 27.41.

On this listening sub-test, the adjusted F value was computed to be 7.35. Since this exceeded the critical value of F , the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Durrell Listening sub-test adjusted by the Metropolitan Listening covariate. Table V, page 107, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Listening sub-test was 22.83. When this mean was adjusted by the covariate (Metropolitan Listening sub-test), an adjusted mean of 22.85 was derived.

On this same Durrell sub-test, a mean of 27.15 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Listening sub-test covariate, the experimental group obtained an adjusted mean of 27.12.

On this listening sub-test, the adjusted F value was computed to be 6.35. Since this value exceeded the critical value of F , the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Durrell Listening sub-test adjusted by the Metropolitan Matching covariate. Table V, page 107, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Listening sub-test was 23.02. When this mean was adjusted by the covariate (Metropolitan Matching sub-test), an adjusted mean of 23.19 was derived.

On this same Durrell sub-test, a mean of 27.15 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Matching sub-test covariate, the experimental group obtained an adjusted mean of 26.98.

Referring again to this Durrell Listening sub-test, the adjusted F value was computed to be 4.80. Since this value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between the means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the

loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Listening sub-test adjusted by the Metropolitan Alphabet covariate. Table V, page 107, shows that, when the Metropolitan Alphabet sub-test was used as the covariate with the Durrell Listening sub-test, the listening mean obtained for the group taught with the control method (Scott-Foresman Program) was 22.83 and the adjusted mean was 23.58.

On this same Durrell listening sub-test, Table V, page 107, also shows that a mean of 27.53 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Alphabet sub-test covariate, an adjusted mean of 26.74 was obtained for this group.

When this Durrell Listening sub-test was adjusted by the Alphabet sub-test on the Metropolitan, the adjusted F value was computed to be 3.70. This F value did not exceed the critical value of F. The mean of the group taught with the experimental method, then, did not differ significantly from that of the group taught with the control method.

In this case the null hypothesis (that there is no significant difference between means of the two sample groups) is accepted.

The computer failed to calculate a zero score on The Metropolitan Alphabet sub-test as a member of N for the experimental group, thus changing the N for this sub-test from 41 to 40. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Flash Word sub-test adjusted by the Metropolitan Word Meaning covariate. Table VI, page 112, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Flash Word sub-test was 24.07. When this mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 24.02 was derived.

On this same Durrell sub-test, a mean of 36.05 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Word Meaning sub-test covariate, the adjusted mean of 36.10 was obtained for this group.

When the word meaning sub-test on the Metropolitan was used to adjust the Durrell Flash Word sub-test, the adjusted F value was

TABLE VI

ANALYSIS OF COVARIANCE RESULTS COMPARING CONTROL AND EXPERIMENTAL
GROUPS ON THE DURRELL FLASH WORD SUB-TEST USING THE
FOUR SUB-TESTS OF THE METROPOLITAN
(INDIVIDUALLY) AS COVARIATES

	Durrell Flash Word						
	Contol Method			Experimental Method			
	N = 42			N = 41			
Covariate	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	F'
Metropolitan Word Meaning	11.74	24.07	24.02	10.34	36.05	36.10	21.42*
Metropolitan Listening	12.19	24.07	24.10	12.22	36.05	36.01	27.41*
Metropolitan Matching**	9.07	24.29	24.53	9.39	36.05	35.81	22.46*
Metropolitan Alphabet***	11.50	24.07	25.15	12.83	36.58	35.44	20.94*

(Critical value of F, df = 1, 80; alpha = .05 is 3.96)

(*Significant at the .05 level of significance)

**N = 41, as the computer failed to calculate one zero score as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score as a member of N in experimental group.

computed to be 21.42. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Durrell Flash Word sub-test adjusted by the Metropolitan Listening covariate. When the Listening sub-test of the Metropolitan is used as the covariate, for the group taught with the control method, Table VI, page 112, illustrates that the mean on the Durrell Flash Word sub-test was 24.07. The adjusted mean was 24.10.

Table VI, page 112, also shows that a mean of 36.05 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Listening sub-test covariate, the adjusted mean of 36.01 was obtained for this group.

When the Flash Word sub-test of the Durrell was adjusted by the Listening sub-test of the Metropolitan, the adjusted F value was computed to be 27.41. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference

between means of the two sample groups) is rejected.

Durrell Flash Word sub-test adjusted by the Metropolitan Matching covariate. Table VI, page 112, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Matching sub-test was 24.29. When this mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 24.53 was derived.

On this same Durrell sub-test, a mean of 36.05 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Word Meaning sub-test covariate, the adjusted mean of 35.81 was obtained for this group.

When the matching sub-test on the Metropolitan was used to adjust the Durrell matching sub-test, the adjusted F value was computed to be 22.46. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the

loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Flash Word sub-test adjusted by the Metropolitan Alphabet covariate. Table VI, page 112, shows that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Flash Word sub-test was 24.07. When this mean was adjusted by the covariate (Metropolitan Alphabet sub-test), an adjusted mean of 25.15 was derived.

On this same Durrell sub-test, a mean of 36.58 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Alphabet sub-test covariate, the adjusted mean of 35.44 was obtained for this group.

When the alphabet sub-test on the Metropolitan was used to adjust the Durrell Flash Word sub-test, the adjusted F value was computed to be 20.94. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference

between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on The Metropolitan Alphabet sub-test as a member of N for the experimental group, thus changing the N for this sub-test from 41 to 40. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Word Analysis sub-test adjusted by the Metropolitan Word Meaning covariate. Table VII, page 117, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Word Analysis sub-test was 23.26. When this mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 23.22 was derived.

On this same Durrell sub-test, a mean of 38.27 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Word Meaning sub-test covariate, the adjusted mean of 38.31 was obtained for this group.

When the word meaning sub-test on the Metropolitan was used to adjust the Durrell Word Analysis sub-test, the adjusted F value was computed to be 28.44. Since this F value exceeded the critical value

TABLE VII

ANALYSIS OF COVARIANCE RESULTS COMPARING CONTROL AND EXPERIMENTAL GROUPS ON THE DURRELL WORD ANALYSIS SUB-TEST USING THE FOUR SUB-TESTS OF THE METROPOLITAN (INDIVIDUALLY) AS COVARIATES

	Durrell Word Analysis						
	Control Method			Experimental Method			
	N = 42			N = 41			
Covariate	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	F'
Metropolitan Word Meaning	11.74	28.26	23.22	10.34	38.27	38.31	28.44*
Metropolitan Listening	12.19	23.26	23.29	12.22	38.27	38.24	34.00*
Metropolitan Matching**	9.07	23.59	23.86	9.39	38.27	38.00	30.83*
Metropolitan Alphabet***	11.50	23.26	24.51	12.83	38.78	37.46	29.37*

(Critical value of F, df = 1, 80; alpha = .05 is 3.96)

(*Significant at the .05 level of significance)

**N = 41, as the computer failed to calculate one zero score as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score as a member of N in experimental group.

of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Durrell Word Analysis sub-test adjusted by the Metropolitan Listening covariate. Table VII, page 117, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Word Analysis sub-test was 23.26. When this mean was adjusted by the covariate (Metropolitan Listening sub-test), an adjusted mean of 23.29 was derived.

On this same Durrell sub-test, a mean of 38.27 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Listening sub-test covariate, the adjusted mean of 38.24 was obtained for this group.

When the Word Analysis sub-test of the Durrell was adjusted by the Metropolitan Listening covariate, an adjusted F value of 34.00 was derived. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between the means of the two sample groups) is rejected.

Durrell Word Analysis sub-test adjusted by the Metropolitan Matching covariate. Table VII, page 117, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Word Analysis sub-test was 23.59. When this mean was adjusted by the covariate (Metropolitan Matching sub-test), an adjusted mean of 23.86 was derived.

On this same Durrell sub-test, a mean of 38.27 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Matching sub-test covariate, the adjusted mean of 38.00 was computed for this group.

When the matching sub-test on the Metropolitan was used to adjust the Durrell Word Analysis sub-test, the adjusted F value was computed to be 30.83. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing

and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Durrell Word Analysis sub-test adjusted by the Metropolitan Alphabet covariate. Table VII, page 117, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Durrell Word Analysis sub-test was 23.26. When this mean was adjusted by the covariate (Metropolitan Alphabet sub-test), an adjusted mean of 24.51 was derived.

On this same Durrell sub-test, a mean of 38.78 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Alphabet sub-test covariate, the adjusted mean of 37.46 was computed for this group.

When the alphabet sub-test on the Metropolitan was used to adjust the Durrell Word Analysis sub-test, the adjusted F value was computed to be 29.37. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on The

Metropolitan Alphabet sub-test as a member of N for the experimental group, thus changing the N for this sub-test from 41 to 40. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Stanford Achievement Test

The following three tables (beginning with Table VIII) show the mean achievement of the group taught by the control method and the mean achievement of the group taught by the experimental method as measured by the Stanford Achievement Test. These results are analyzed by comparing the mean of the two groups and are indicated by $\bar{Y}$ on the table in the control and experimental columns. The Metropolitan Reading Readiness sub-tests are noted in the covariate column and the results are indicated by $\bar{X}$ in that respective column.

The mean of the Stanford Achievement Test, as adjusted by the Covariate Metropolitan Reading Readiness Test is presented on the following three tables and is indicated in the Y' column.

The value of F upon which basis the null hypothesis is accepted or rejected is indicated in the F' (adjusted F value) column.

TABLE VIII

ANALYSIS OF COVARIANCE RESULTS COMPARING CONTROL AND EXPERIMENTAL
GROUPS ON THE STANFORD WORD READING SUB-TEST USING THE
FOUR SUB-TESTS OF THE METROPOLITAN
(INDIVIDUALLY) AS COVARIATES

	Stanford Word Reading						
	Control Method			Experimental Method			
	N = 42			N = 41			
Covariate	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	F'
Metropolitan Word Meaning	11.74	21.24	21.16	10.34	25.78	25.86	14.65*
Metropolitan Listening	12.19	21.24	21.25	12.22	25.78	25.76	17.04*
Metropolitan Matching**	9.07	21.37	21.49	9.39	25.78	25.65	14.34*
Metropolitan Alphabet***	11.50	21.24	21.84	12.83	25.95	25.32	11.81*

(Critical value of F, $df = 1, 80$; $\alpha = .05$ is 3.96)

(*Significant at the .05 level of significance)

**N = 41, as the computer failed to calculate one zero score as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score as a member of N in experimental group.

Stanford Word Reading sub-test adjusted by the Metropolitan Word Meaning covariate. Table VIII, page 122, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Word Reading sub-test was 21.24. When this mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 21.16 was derived.

On this same Stanford sub-test, a mean of 25.78 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Word Meaning sub-test covariate, the adjusted mean of 25.86 was obtained for this group.

When the word meaning sub-test on the Metropolitan was used to adjust the Stanford Word Reading sub-test, the adjusted F value was computed to be 14.65. Since this F value exceeded the critical value of F , the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Stanford Word Reading sub-test adjusted by the Metropolitan Listening covariate. Table VIII, page 122, illustrates that the mean of the group taught with the control method (Scott-Forsman Program) on the Stanford Word Reading sub-test was 21.24. When this mean was

adjusted by the covariate (Metropolitan Listening sub-test), an adjusted mean of 21.25 was derived.

On this same Stanford sub-test, a mean of 25.78 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Listening sub-test, an adjusted mean of 25.76 was obtained for this group. When the Listening sub-test on the Metropolitan was used to adjust the Stanford Word Reading sub-test, the adjusted F value was computed to be 17.04. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Stanford Word Reading sub-test adjusted by the Metropolitan Matching Covariate. Table VIII, page 122, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Word Reading sub-test was 21.37. When this mean was adjusted by the covariate (Metropolitan Matching sub-test), an adjusted mean of 21.49 was derived.

On this same Stanford sub-test, a mean of 25.78 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Matching sub-test covariate, an adjusted

mean of 25.65 was obtained for this group.

When the matching sub-test on the Metropolitan was used to adjust the Stanford Word Reading sub-test, the adjusted F value was computed to be 14.34. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Stanford Word Reading sub-test adjusted by the Metropolitan Alphabet covariate. Table VIII, page 122, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Word Reading sub-test was 21.24. When this mean was adjusted by the covariate (Metropolitan Alphabet sub-test), an

adjusted mean of 21.84 was derived.

On this same Stanford sub-test, a mean of 25.95 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Alphabet sub-test covariate, an adjusted mean of 25.32 was obtained for this group.

When the alphabet sub-test on the Metropolitan was used to adjust the Stanford Word Reading sub-test, the adjusted F value was computed to be 11.81. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Stanford Paragraph Meaning sub-test adjusted by the Metropolitan Word Meaning covariate. Table IX, page 128, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Paragraph Meaning sub-test was 21.38. When this mean was adjusted by the covariate (Metropolitan Word Meaning sub-test), an adjusted mean of 21.24 was derived.

On this same Stanford sub-test, a mean of 24.24 was obtained for the group taught with the experimental method (Lippincott Program). Adjusted by the Metropolitan Word Meaning sub-test covariate, an adjusted mean of 24.39 was obtained for this group.

When the word meaning sub-test on the Metropolitan was used to adjust the Stanford Paragraph Meaning sub-test, the adjusted F value was computed to be 4.48. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means of the two sample groups) is rejected.

Stanford Paragraph Meaning sub-test adjusted by the Metropolitan Listening covariate. Table IX, page 128, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Paragraph Meaning sub-test, was 21.38. When this mean was

TABLE IX

ANALYSIS OF COVARIANCE RESULTS COMPARING CONTROL AND EXPERIMENTAL GROUPS ON THE STANFORD PARAGRAPH MEANING SUB-TEST USING THE FOUR SUB-TESTS OF THE METROPOLITAN (INDIVIDUALLY) AS COVARIATES

Covariate	Stanford Paragraph Meaning						
	Control Method			Experimental Method			F'
	N = 42			N = 41			
	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	
Metropolitan Word Meaning	11.74	21.38	21.24	10.34	24.24	24.39	4.48*
Metropolitan Listening	12.19	21.38	21.40	12.22	24.24	24.22	8.82*
Metropolitan Matching**	9.07	21.54	21.71	9.39	24.24	24.07	3.27
Metropolitan Alphabet***	11.50	21.38	22.10	12.83	24.45	23.69	1.58

(Critical value of F, df = 1, 80; alpha = .05 is 3.96)

(*Significant at the .05 level of significance)

**N = 41, as the computer failed to calculate one zero score as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score as a member of N in experimental group.

adjusted by the covariate (Metropolitan Listening sub-test), an adjusted mean of 21.40 was obtained.

A mean of 24.24 was derived for the group taught with the experimental method (Lippincott Program), in this Stanford Paragraph Meaning sub-test. Adjusted by the Metropolitan Listening sub-test covariate, an adjusted mean of 24.22 was obtained for this group.

When the listening sub-test on the Metropolitan was used to adjust the Stanford Paragraph Meaning sub-test, the adjusted F value was computed to be 4.82. Since this F value exceeded the critical value of F, the mean of the group taught with the experimental method was significantly higher than that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means for the two sample groups) is rejected.

Stanford Paragraph Meaning sub-test adjusted by the Metropolitan Matching covariate. Table IX, page 128, shows that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Paragraph Meaning sub-test was 21.54. When this mean was adjusted by the covariate (Metropolitan Matching sub-test), an adjusted mean of 21.71 was derived.

A mean of 24.24 was derived for the group taught with the experimental method (Lippincott Program), on this Stanford Paragraph

Meaning sub-test. Adjusted by the Metropolitan Matching sub-test covariate, an adjusted mean of 24.07 was obtained for this group.

When the matching sub-test on the Metropolitan was used to adjust the Stanford Paragraph Meaning sub-test, the adjusted F value was computed to be 3.27. Since this F value did not exceed the critical value of F, the mean of the group taught with the experimental method did not differ significantly from that of the group taught with the control method.

The adjusted F value (3.27) is less than the table value of F (3.96). The null hypothesis (that there is no significant difference between the means for the two sample groups), is accepted.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Stanford Paragraph Meaning sub-test adjusted by the Metropolitan Alphabet covariate. Table IX, page 128, shows that the mean of the group taught with the control method (Scott-Foresman Program) on the

Stanford Paragraph Meaning sub-test, was 21.38. When this mean was adjusted by the covariate (Metropolitan Alphabet sub-test), an adjusted mean of 22.10 was obtained.

A mean of 24.45 was derived for the group taught with the experimental method (Lippincott Program), on this Stanford Paragraph Meaning sub-test. Adjusted by the Metropolitan Alphabet sub-test covariate, an adjusted mean of 23.69 was obtained for this group.

When the alphabet sub-test on the Metropolitan was used to adjust the Stanford Paragraph Meaning sub-test, the adjusted F value was computed to be 1.58. Since this F value does not exceed the critical value of F, the mean of the group taught with the experimental method did not differ significantly from that of the group taught with the control method.

The null hypothesis (that there is no significant difference between means for the two sample groups), is accepted.

The computer failed to calculate a zero score on the Metropolitan Alphabet sub-test as a member of N for the experimental group, thus changing the N for this sub-test from 41 to 40. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Stanford Vocabulary sub-test adjusted by the Metropolitan Word Meaning covariate. Table X, page 133, illustrates that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Vocabulary sub-test was 25.52. When this mean was adjusted by the covariate (Metropolitan Matching sub-test), an adjusted mean of 25.32 was derived.

A mean of 25.24 was derived for the group taught with the experimental method (Lippincott Program), on this Stanford Vocabulary sub-test. Adjusted by the Metropolitan Word Meaning sub-test covariate, an adjusted mean of 25.45 was obtained for this group.

When the Word Meaning sub-test on the Metropolitan was used to adjust the Stanford Vocabulary sub-test, the adjusted F value was computed to be .00. Since this F value does not exceed the critical value of F, the mean of the group taught with the experimental method did not differ significantly from that of the group taught with the control method.

The null hypothesis (that there is no significant difference between the means of the sample groups), is accepted.

Stanford Vocabulary sub-test adjusted by the Metropolitan Listening covariate. Table X, page 133, shows that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Vocabulary sub-test was 25.52. When this mean was adjusted

TABLE X

ANALYSIS OF COVARIANCE RESULTS COMPARING CONTROL AND EXPERIMENTAL
GROUPS ON THE STANFORD VOCABULARY SUB-TEST USING THE
FOUR SUB-TESTS OF THE METROPOLITAN
(INDIVIDUALLY) AS COVARIATES

	Stanford Vocabulary						
	Control Method			Experimental Method			
	N = 42			N = 41			
Covariate	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	$\bar{X}$	$\bar{Y}$	$\bar{Y}'$	F'
Metropolitan Word Meaning	11.74	25.52	25.32	10.34	25.24	25.45	.00
Metropolitan Listening	12.19	25.52	25.55	12.22	25.24	25.22	.04
Metropolitan Matching**	9.07	25.63	25.84	9.39	25.24	25.04	.23
Metropolitan Alphabet***	11.50	25.52	26.24	12.83	25.33	24.57	.92

(Critical value of F, df = 1, 80; alpha = .05 is 3.96)

(*Significant at the .05 level of significance)

**N = 41, as the computer failed to calculate one zero score as a member of N in control group.

***N = 40, as the computer failed to calculate one zero score as a member of N in experimental group.

by the covariate (Metropolitan Listening sub-test), an adjusted mean of 25.55 was derived.

A mean of 25.24 was derived for the group taught with the experimental method (Lippincott Program), on this Stanford Vocabulary sub-test. Adjusted by the Metropolitan Listening sub-test covariate, an adjusted mean of 25.22 was obtained for this group.

When the listening sub-test on the Metropolitan was used to adjust the Stanford Vocabulary sub-test, the adjusted F value was computed to be .04. Since this F value did not exceed the critical value of F , the mean of the group taught with the experimental method did not differ significantly from that of the group taught with the control method.

The null hypothesis (that there is no significant difference between the means of the two sample groups), is accepted.

Stanford Vocabulary sub-test adjusted by the Metropolitan Matching covariate. Table X, page 133, shows that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Vocabulary sub-test was 25.63. When this mean was adjusted by the covariate (Metropolitan Matching sub-test), an adjusted mean of 25.84 was obtained for this group.

A mean of 25.24 was derived for the group taught with the experimental method (Lippincott Program), on this Stanford Vocabulary

sub-test. Adjusted by the Metropolitan Matching sub-test covariate, an adjusted mean of 25.04 was obtained for this experimental group.

When the matching sub-test on the Metropolitan was used to adjust the Stanford Vocabulary sub-test, the adjusted F value was computed to be .23. Since this F value did not exceed the critical value of F, the mean of the group taught with the experimental method did not differ significantly from that of the group taught with the control method.

The null hypothesis (that there is no significant difference between the means of the sample groups), is accepted.

The computer failed to calculate a zero score on the Metropolitan Matching sub-test as a member of N for the control group, thus changing the N for this sub-test from 42 to 41. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

Stanford Vocabulary sub-test adjusted by the Metropolitan Alphabet covariate. Table X, page 133, shows that the mean of the group taught with the control method (Scott-Foresman Program) on the Stanford Vocabulary sub-test was 25.52. When this mean was adjusted by the

covariate (Metropolitan Alphabet sub-test), an adjusted mean of 26.24 was derived.

A mean of 25.33 was derived for the group taught with the experimental method (Lippincott Program) on this Stanford Vocabulary sub-test. Adjusted by the Metropolitan Alphabet sub-test covariate, an adjusted mean of 24.57 was obtained for this group.

When the Alphabet sub-test on the Metropolitan was used to adjust the Stanford Vocabulary sub-test, the adjusted F value was computed to be .92. Since this F value did not exceed the critical value of F, the mean of the group taught with the experimental method did not differ significantly from that of the group taught with the control method.

The null hypothesis (that there is no significant difference between the means of the two sample groups), is accepted.

The computer failed to calculate a zero score on The Metropolitan Alphabet sub-test as a member of N for the experimental group, thus changing the N for this sub-test from 41 to 40. This resulted in the loss of one degree of freedom which would, in turn, alter the mean score on this sub-test. However, Dr. Al Suvak, Director of Testing and Counseling, Montana State University, who programmed the data for the computer, felt that the change in the mean score would not be significant enough to justify a rerun of the entire program.

SUMMARY

The writer attempted in the preceding chapter to present and describe the results of the statistical analysis that was used to treat the raw data collected by administering the three standardized tests described in Chapter 2. The first test was the Metropolitan Reading Readiness Test, which was administered to both the group of first grade children taught by the control method of beginning reading instruction (Scott-Foresman Program) and to the group taught by the experimental method (Lippincott Program) during the second week of school in September, 1971.

All tests were administered, scored and the raw data were programmed, then run through the computers in the Montana State University Computer Center at Bozeman, Montana.

An analysis of covariate statistical technique was chosen to compare the means of the two dependent variables, the control program and the experimental program of teaching beginning reading. These means were derived from test results taken from the Durrell Analysis of Reading Difficulty and the Stanford Achievement Tests.

The uncontrolled concomitant variable (pre-reading abilities) was measured by the use of the Metropolitan Reading Readiness Test and was referred to as the covariate.

Each of the five sub-test means of the Durrell Analysis of

Reading Difficulty Test (oral reading, silent reading, listening, flashwords and word analysis) was adjusted by each of the four sub-test means on the Metropolitan Reading Readiness Test (word meaning, listening, matching and alphabet).

Then each of the three sub-test means on the Stanford Achievement Test (word reading, paragraph meaning and vocabulary) was adjusted by each of the four sub-test means on the Metropolitan Reading Readiness Test.

Since the reading ability of the two groups (the group taught by the experimental method and the group taught by the control method) could not be experimentally controlled prior to the beginning of the study, an analysis of covariance design was used to test for a comparison of reading achievement by controlling this variable statistically.

The null hypothesis of no difference with the level of significance set at .05, was used to test the theory that no significant difference would be detected between the reading achievement of the group taught by the experimental method and the group taught with the control method.

The collected data were presented in table form with a subsequent narrative style discussion.

The results of the experimental design for the Durrell Analysis of Reading Difficulty were presented in the first five tables beginning with Table III. The results of the Stanford Achievement Test were

presented in the second set of three tables, beginning with Table VIII.

The null hypothesis was rejected at the .05 level of significance (with the critical value at 3.96) for all the adjusted F values (when the Durrell and Stanford sub-tests were adjusted by the Metropolitan Word Meaning, Listening, Matching and Alphabet covariates) on the following sub-tests:

- (1) Durrell Oral Reading
- (2) Durrell Silent Reading
- (3) Durrell Listening
- (4) Durrell Flashwords
- (5) Durrell Word Analysis
- (6) Stanford Word Reading

Each sub-test of the Stanford Achievement Test, in this study, was adjusted by all four of the sub-tests of the Metropolitan Reading Readiness Test. On one sub-test, the Stanford Paragraph Meaning, using two covariates, the Metropolitan Word Meaning and Metropolitan Listening, the null hypothesis was rejected. On the same Stanford Paragraph Meaning sub-test, using the Metropolitan Matching and Metropolitan Alphabet covariates, the adjusted F values indicated that the null hypothesis was accepted at the .05 level of significance (where the values of F were less than the critical value of 3.96).

On the Stanford Vocabulary sub-test (when this sub-test was

adjusted by the Metropolitan Word Meaning, Listening, Matching and Alphabet covariates), all of the adjusted F values indicated that the null hypothesis was accepted at the .05 level of significance (where the values of F were less than the critical value of 3.96).

The next chapter deals with the summary, recommendations, and conclusions reached by the writer in conducting this study.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In this chapter the writer will present a general thesis summary, delineate various conclusions reached, and present recommendations made as a result of this study.

SUMMARY

This dissertation dealt with the problem of attempting to determine which method of teaching beginning reading to first grade children, was the most efficacious, a meaning-emphasis or a code-emphasis method.

In conducting the study which attempted to determine which of the two methods was the most effective, the first step was to define the term reading. Through the use of several sources, reading was defined as a decoding process, in which the reader interprets and evaluates the author's intended meaning in terms of the reader's background, experience and understanding.

Through the review of literature and an analysis of data, the writer hoped to answer the following questions:

1. What factors, on a composite basis, determine the reading ability of a child?
2. What is the definition of a code-emphasis program of teaching reading?

3. What is the definition of a meaning-emphasis program of teaching reading?
4. What is the current philosophy in the code-emphasis and meaning-emphasis methodologies of teaching reading?
5. Which group of first graders, the group taught by the meaning-emphasis or the group taught by the code-emphasis method, will achieve the highest scores on two different standardized achievement tests?

In order to answer the preceding questions and complete the study, the following procedures were followed:

1. Establishing a workable definition of the reading process.
2. Developing an experimental design in which the control of natural processes is attempted and observed. The two first grades in each of two schools in the Billings Public Schools were selected for the purposes of this study. Some of the techniques involved in the design which were utilized were:
 - a. All of the children in the four classrooms selected, participated in the study.
 - b. The individuals for the two participating classrooms in each building were selected on the basis of a sampling procedure that would relate the sample to the general population.
 - c. The children in the four classrooms had their vision and hearing checked so that these contaminating factors were controlled before the study began.
 - d. The teachers to whom the control and experimental groups were given for instruction were selected on the basis of the two in each building who were most similar in education, technique and ability.
 - e. The writer chose schools to participate in the study which were located in areas which encompass the major socio-economic divisions of upper, middle, and lower stratifications.

- f. The Metropolitan Reading Readiness Test was used to determine the comparative reading readiness abilities of the children as they entered first grade and the scores derived were used as the co-variant which could not be controlled.
 - g. Two instruments were used to measure the reading achievement at the end of the school year. One test was the Durrell Analysis of Reading Difficulty and the other was the Stanford Achievement Test.
 - h. The control method of teaching beginning reading was from the Scott-Foresman Basal Reader Program and is referred to as the meaning-emphasis method.
 - i. The two groups taught by the experimental method used the Lippincott Basal Reader Program and this method is referred to as the code-emphasis method.
- 3. Literature and related research dealing with current thinking regarding two basic methods of teaching beginning reading--code-emphasis and meaning-emphasis--were examined in the review of related literature.
 - 4. The tests administered to the children yielded data that were analyzed and interpreted.
 - 5. The final procedure was the writing of the summary, noting conclusions and making recommendations as a result of the review of literature and analysis of data.

This study was limited in the following ways:

- 1. The study was limited to the study of four first grade classrooms in Billings, Montana, which comprised the population sample. It was the hope that this study would not be intended for the purpose of making broad, comprehensive recommendations for the most effective method of teaching reading, but would hopefully be useful to the Billings Public Schools.
- 2. The teachers were not of identical qualifications.
- 3. The two philosophies of teaching reading, code-emphasis and meaning-emphasis are not completely polarized in terms

of their philosophic approaches to the teaching of phonics in beginning reading.

4. The pre-school experiences that each child had prior to coming to the first grade varied.
5. The research done for the review of literature section of this paper was confined to the libraries of Montana State University and Eastern Montana College and included the ERIC Documents for the period of time 1970-1972.
6. The principals in the two buildings perhaps had varying philosophies of supervision.
7. The time devoted to teaching the reading process could possibly vary in each of the four classrooms.
8. The ages of the children in the groups varied to some degree.
9. The sex category in each classroom varied to some degree.
10. New children that entered the classrooms later than September could have an effect upon the group achievement results in that they would not have equal time in either of the two teaching programs as did the original children involved in the study.

The review of literature and the analysis of data attempted to answer the questions that were posed for the study.

In answer to question one, the following factors were found to determine the reading ability of a child. A child's reading ability is determined through experiences with which he is confronted and the other individuals with whom he interacts. Everything that affects a child, from his birth until he reaches the first grade reading experience develops the linguistic ability and the social conceptualization that are necessary and endemic to the decoding process.

The socialization of a pre-lingual child occurs as the baby acts randomly on a trial and error basis, then gradually, through interaction with parents and other socializing agents, becomes aware of the relationship between acts and symbols. Finally the child uses meanings to designate what is on his mind.

Children learn for themselves, but the social, psychological and physical environment created for them and in which they are an interacting entity, determine what they become, and thus determines what is brought to the beginning reading experience.

Evidence in the literature indicates that what occurs in the child's formative environment does have a definite impact on the type of reading success that he experiences in school.

Despite the environmental impact, one would seem to have difficulty in teaching anything to any child if the child does not have some positive genetic inheritance, or if brain damage and birth trauma have inhibited a child's intellectual development.

Genetic patterns do, however, develop and are subsumed under the environment rubric. This concept does have a direct relationship to the reading process. Before a child can read, he must develop a vocabulary, linguistic patterns and a learning style based on pre-school cultural experiences.

On this basis, then, reading is the facilitation of language and is a linguistic performance, which entails verbal ability.

Intelligence or cognitive skills would seem to be one criterion for success in reading, also. At least, if we assume that to learn to perform any functional activity in society presupposes that some form of intelligent functioning occurs.

In answer to question two, the definition of a code-emphasis program of teaching reading is, first of all, very complicated. Linguists define language as being oral in nature and basically a means of communication. The process of communication occurs in the context of either the written or spoken dimension of expressive language. Communications may be either encoding or decoding, writing or reading, speaking or listening, and demand that some sort of linguistic code be present.

This linguistic code may be manifested either overtly, as the rules for communication within a cultural context are brought into play in the cortex of the brain, or implied through the subconscious, drawing upon experiences recorded in the brain during the formative stages of the human organism's development.

The code-emphasis proponents believe that decoding is important at the beginning stages of reading and believe that decoding should be stressed and comprehension should be perhaps second in priority. These proponents believe that the initial stage in reading instruction should emphasize teaching children to master a code--the alphabetic code.

The code-emphasis process, then, exposes the child in the

reading readiness stage to a confrontation with individual letters of the alphabet rather than expecting the child to gain readiness for reading through visual and esthetic experiences with concrete objects.

The sounds of the individual letters are learned and the letters are then synthesized into whole words. The whole words are then synthesized into meaningful sentences as the stages of sequential instruction in the reading process are developed.

The gaining of meaning is not sacrificed completely however, despite emphasis upon the decoding process in the code-emphasis context. The sequences of instruction that follow the initial stage of the reading process concentrate upon obtaining meaning as well as continuing an emphasis upon the decoding skills.

In answer to question three, literature was reviewed to determine a definition of a meaning-emphasis program of teaching reading. The meaning-emphasis method of teaching reading stresses obtaining meaning from the printed page at the onset of the reading process. Deriving meaning from the printed symbols takes precedence over the mechanics of learning a code to unlock the words even at the initial stages of the beginning-to-read process. This emphasis upon meaning is stressed at an earlier stage in the learning-to-read process in the meaning-emphasis procedure than with the code-emphasis procedure.

The meaning-emphasis method is synonymous with the analytic method for the purposes of this study. In this analytic method,

emphasis for the beginning reader is upon meaning. The child memorizes a basic sight vocabulary and on the basis of this is directed to the study of phonetic analysis, structural analysis, word form and context clues.

Some advocates of the meaning-emphasis method say that many words in the primary years are learned by sight because authorities recognize that many of the common, basic words do not reflect phonic generalizations.

The meaning-emphasis method then, stresses the memorization of the configuration of whole words, rather than extreme emphasis upon the individual letters and the phoneme-grapheme relationship, in terms of sound, as does the code-emphasis method.

In attempting to answer question four, the literature was reviewed to get some indication of the current philosophy in the code-emphasis and meaning-emphasis methodologies of teaching reading.

The code-emphasis proponents advocate the teaching of phonics in some form. The consensus is that children need visual and auditory clues in word recognition. In the code-emphasis orientation, children learn phonetic recognition of letters and words, then these words are formed into phrases and sentences.

One of the contemporary advocates in the research pertaining to the code-emphasis method suggests that a code-emphasis approach has attributes which would support its use (but only initially) in the

beginning stages of teaching reading, so the major thrust of this study is based upon the beginning stages of the learning to read process.

The linguistic concept of teaching reading is very definitely related to the phonic method and code-emphasis methods of teaching, also. Just as the code-emphasis method of teaching reading places emphasis upon building words, sentences and phrases synthetically into reading concepts, the linguistic approach or word family approach requires the child to make discriminations between initial, terminal, and other phonemes within words which rhyme or words which compose a word's family.

The emphasis upon vowel regularity and consonant substitution is also recognizably a feature of the phonic and linguistics approach to the teaching of reading.

There is some literature indicating that the means of breaking the reading process into a synthetic means of word attack and decoding is a function of the central nervous system.

The physiological premise that the left hemisphere of the brain controls the language function of the human organism should indicate that the reading process is a neurological one.

This concept is an explanation to some degree, of the reading process as a definite cognitive activity. The cognitive process could possibly be related to the code-emphasis of teaching reading.

An example of the code-emphasis procedure, indicated by the

literature (as implemented in the Lippincott program), is that of helping a child hear the phonemes in the words he hears and says very well. The child says "fat" perfectly. Beginning there, the program attempts to get the child to recognize and to identify the three phonemes in "fat." At the same time he is shown how the three letters represent these same phonemes.

First the program begins with the short vowels because they appear in nearly every word presented, then it goes to the use of consonants. As the child works with a steady accumulation of new words, first in lists and then in stories (which use only the letter sounds that have been taught up to any one point), the child learns to recognize letter sounds in words.

With regard to the meaning-emphasis methodology, there are various steps which are integral to the beginning reading process in the implementation of the meaning-emphasis, sight word process.

The principles of teaching word recognition are to proceed from the familiar to the unfamiliar associating a name with a picture of an object. First tell a student the whole word, then give hints, and finally let the student figure out the word from a variety of techniques he has learned.

As mentioned in the literature reviewed, the code-emphasis process uses the phonic concept as does the meaning-emphasis process. Consider the ways a child learns to recognize and identify a word.

There are four major areas to be considered as far as instruction in word recognition is concerned: (1) context, (2) phonetic analysis, (3) structural analysis, and (4) comprehension. These major areas are of importance in both the meaning-emphasis and code-emphasis methods.

Some of the literature reviewed illustrated the Scott-Foresman (meaning-emphasis method) implementation of the meaning-emphasis procedure. For example, in the phonetic-analysis program in the "New Basic Readers," children work first with consonant elements in the words because consonants are the more stable element in our language, unaffected by accent or vowels.

Vowel elements are taught next--by drawing children's attention to phonetic elements in words they recognize at sight.

The key difference in phonic analysis application between the Lippincott and Scott-Foresman is that Lippincott (code-emphasis method) teaches short vowels first and then consonants and Scott-Foresman emphasizes consonants before vowels.

The next point of emphasis is that Lippincott stresses the learning of letters and their related sounds (grapheme-phoneme relationship) so that the word is recognized by virtue of its composite letter makeup.

Scott-Foresman, on the other hand, stresses phonetic elements in whole words the children recognize at sight.

In attempting to answer question five, the data were reviewed and analyzed. In order to determine which method of teaching beginning reading was more effective (the code-emphasis or the meaning-emphasis), the writer collected raw data by administering three standardized tests. The three tests were the Metropolitan Reading Readiness Test, The Durrell Analysis of Reading Difficulty and the Stanford Achievement Test.

An analysis of covariate statistical technique was chosen to compare the means of the two dependent variables, which were the control program (Scott-Foresman Program) and the experimental program (Lippincott Program) of teaching beginning reading.

The uncontrolled concomitant variable (pre-reading abilities) was measured by the use of the Metropolitan Reading Readiness test and was referred to as the covariate.

The null hypothesis of no difference with the level of significance set at .05 was used to test the theory that no significant difference would be detected between the reading achievement of the group taught by the experimental method and the group taught with the control method.

The null hypothesis was rejected at the .05 level of significance, with the critical value of 3.96 exceeding all the adjusted F values (when the Durrell and Stanford sub-tests were adjusted by the Metropolitan Word meaning, Listening, Matching and Alphabet covariates)

on the following sub-tests:

- (1) Durrell Oral Reading
- (2) Durrell Silent Reading
- (3) Durrell Listening
- (4) Durrell Flashwords
- (5) Durrell Word Analysis
- (6) Stanford Word Reading

Each sub-test of the Stanford Achievement Test, in this study, was adjusted by all four of the sub-tests of the Metropolitan Reading Readiness Test. On one sub-test, (the Stanford Paragraph Meaning), using two covariates--the Metropolitan Word Meaning and the Metropolitan Listening--the null hypothesis was rejected. On the same Stanford Paragraph Meaning sub-test, using the Metropolitan Matching and Metropolitan Alphabet covariates, the adjusted F values indicated that the null hypothesis was accepted at the .05 level of significance (where the values of F were less than the critical value of 3.96).

The sub-tests that were used for the study on the Durrell Analysis of Reading Difficulty showed an F value that allowed the null hypothesis to be rejected. In other words, the mean scores of the children who were taught with the Lippincott Program (the Experimental program) were greater than those mean scores of the children taught with the Scott-Foresman Program (the control program) on all of the Durrell sub-tests. Their achievement after a period of seven months

was, then, greater than the achievement of those children taught with the Scott-Foresman materials.

On the Stanford Vocabulary sub-test (when this sub-test was adjusted by the Metropolitan Word Meaning, Listening, Matching and Alphabet covariates), all of the adjusted F values indicated that the null hypothesis was accepted at the .05 level of confidence (where the levels of significance were less than the critical value of 3.96).

In other words, on the word meaning sub-test of the Stanford, the mean scores of the children who were taught with the Lippincott Program were greater than those mean scores of the children taught with the Scott-Foresman Program.

On another sub-test of the Stanford (the Paragraph Meaning), the mean scores of the children who were taught with the Lippincott Program were greater than those mean scores of the children taught with the Scott-Foresman Program, on the basis of the adjustment made by the Metropolitan Word Meaning and Listening covariates. On the basis of the adjustment made by the Metropolitan Matching and Alphabet covariates there was no significant difference in the mean scores of the children taught with the Lippincott and the Scott-Foresman Programs.

CONCLUSIONS

Based on this study the following were concluded:

1. Reading is a term that applies to decoding written symbols so that communication and understanding takes place between the author of the written symbols and the decoder.
2. The mechanics of the reading process, as included in the code-emphasis and meaning-emphasis, are merely a means to an end in the communication process that occurs between an author and a reader.
3. The abilities that a child brings to the beginning reading process in the first grade are determined by a combination of factors. These factors include: parent and peer social interaction processes, genetically determined intellectual ability and the linguistic patterns developed as a result of environment.
4. The success that a child achieves in the first grade reading process is probably more affected by past social experiences and intellectual potential than whatever beginning reading method is utilized in the first grade experience.
5. Despite an early beginning-to-read deficit, boys soon catch up with girls, so that the sex factor is negligible, as far as reading success is concerned.
6. No one has completely identified what intangible or tangible factors are involved in determining what allows some children to achieve success and other children to fail in the beginning to read process.
7. Reading is a neurological and psychological process.
8. Children learn to read with both the use of the meaning-emphasis and the code-emphasis methods of teaching reading.
9. Both the code-emphasis and meaning-emphasis methods of teaching beginning reading use philosophies of phonics and linguistic orientation.

10. The code-emphasis method of teaching beginning reading relies mainly on letter names and letter sounds for readiness procedures.
11. The meaning-emphasis method of teaching beginning reading relies on concrete experiences to a greater degree than does the code emphasis method in the readiness procedures.
12. The meaning-emphasis method of teaching beginning reading uses the concept of teaching consonants first, then short vowels in the teaching procedure.
13. The code-emphasis method of teaching beginning reading uses the concept of teaching short vowels first, then most consonants in the teaching procedure.
14. The Lippincott basal series stresses the learning of letters and their related sounds so that the word is recognized by virtue of its composite letter make-up.
15. The Scott-Foresman basal series (pre-1970) stresses phonetic elements in whole words that the children recognize at sight.
16. The code-emphasis method of teaching beginning reading produced, in this study, significant statistical evidence of greater achievement than did the meaning-emphasis method at the .05 level of significance.
17. The Durrell Analysis of Reading Achievement, an individually administered test, produced greater significant statistical evidence of achievement in beginning reading in the code-emphasis sample group over the meaning-emphasis sample group, than did the Stanford Achievement Test, a group-administered test.

RECOMMENDATIONS

Based on this study the following were concluded:

1. A predominantly code-emphasis method of beginning reading instruction could be used in a predominantly middle-class area school to produce greater achievement than a

meaning-emphasis method.

2. Further research should be conducted in an attempt to determine which methods of teaching beginning reading would be more effective in predominantly poverty school areas.
3. All school personnel could profit from more intensive training in the teaching of reading concepts since it is such a basic and complicated process.
4. School personnel should emphasize the importance of early childhood development to parents.
5. Both code-emphasis and meaning-emphasis methods of teaching reading should be included in all basal texts used to teach beginning reading.
6. Further research should be conducted to gain greater insight into the complexities of teaching beginning reading.

The writer noted at the beginning of this paper that a controversy existed as to the most effective method to teach beginning reading. After doing the research for this study and analyzing the data, the writer joins the ranks of those who are not committed to any one method. The search continues and for the sake of the preservation of human society, the seeking is justified, for every effort is a vital link in the consummation of the human desire for freedom. This freedom can only be achieved through an effective process of gaining meaning from the written page and an intelligent interpretation of an author's message. In regard to the relationship between reading books and gaining freedom, Kneller (43:128) quotes Sartre's succinct statement:

. . . each book, is a recovery of the totality of being. Each of them presents this totality to the freedom of the spectator. For this is the requisite goal . . . to recover this world not by giving it to be seen as it is, but as if it had its source in human freedom.

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APPENDICES

APPENDIX A

RESULTS OF COMPUTATIONS, SUMMARIZED
DURRELL ORAL READING SUB-TEST

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	-156.6797	606.5703	660.3984	1	
	W	81	4203.3437	788.2344	5392.5898	5244.7734	80	65.5597
	Total	82	4243.8086	631.5547	5999.1602	5905.1719	81	660.3984
F=10.0732								
Metropolitan Listening	A	1	.0156	3.2539	606.5703	596.9648	1	
	W	81	489.5039	723.6016	5392.5898	4322.9336	80	54.0367
	Total	82	498.5195	726.8555	5999.1602	4919.8984	81	596.9648
F=11.0474								
Metropolitan Matching	A	1	2.0586	33.4492	542.9336	470.9453	1	
	W	80	862.5391	945.5898	5275.5195	4233.8789	79	53.6567
	Total	81	864.5977	979.0391	5818.4531	4709.8242	80	470.9453
F=8.7770								
Metropolitan Alphabet	A	1	35.9687	158.3867	697.4375	324.5928	1	
	W	80	1020.2773	1374.1758	5092.9531	3242.1240	79	41.0395
	Total	81	1056.2461	1532.5625	5790.3906	3566.7168	80	324.5928
F=7.9093								

APPENDIX B
RESULTS OF COMPUTATIONS, SUMMARIZED
DURRELL SILENT READING SUB-TEST

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	-138.6562	475.0547	509.8281	1	
	W	81	4203.3437	589.4414	4625.4531	4542.7930	80	56.7849
	Total	82	4243.8086	450.7852	5100.5078	5052.6211	81	509.8281
					F=8.9782			
Metropolitan Listening	A	1	.0156	2.8828	475.0547	467.7146	1	
	W	81	489.5039	623.6992	4625.4531	3830.7698	80	47.8846
	Total	82	489.5195	626.5820	5100.5078	4298.4844	81	467.7146
					F=9.7675			
Metropolitan Matching	A	1	2.0586	29.4883	421.9023	364.4609	1	
	W	80	862.5391	857.0742	4519.0742	3667.4304	79	46.4232
	Total	81	864.5977	886.5625	4940.9766	4031.8914	80	364.4609
					F=7.8508			
Metropolitan Alphabet	A	1	35.9687	140.0625	545.3984	281.3708	1	
	W	80	1020.2773	1069.4531	4395.5781	3274.5801	79	41.4504
	Total	81	1056.2461	1209.5156	4940.9766	3555.9509	80	281.3708
					F=6.7881			

APPENDIX C
RESULTS OF COMPUTATIONS, SUMMARIZED
DURRELL LISTENING SUB-TEST

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	-124.9724	385.9336	480.6484	1	
	W	81	4203.3437	1575.1211	5818.9609	5228.7148	80	65.3589
	Total	82	4243.8086	1450.1484	6204.8945	5709.3633	81	480.6484
					F=7.3540			
Metropolitan Listening	A	1	.0156	2.5977	385.9336	378.3320	1	
	W	81	489.5039	718.0195	5818.9609	4765.7461	80	59.5718
	Total	82	489.5195	720.6172	6204.8945	5144.0781	81	378.3320
					F=6.3509			
Metropolitan Matching	A	1	2.0586	26.7891	348.3047	294.9883	1	
	W	80	862.5391	881.5898	5756.1016	4855.0391	79	61.4562
	Total	81	864.5977	908.3789	6104.4062	5150.0273	80	294.9883
					F=4.800			
Metropolitan Alphabet	A	1	35.9687	127.3633	450.9687	197.3242	1	
	W	80	1020.2733	1181.1758	5583.8125	4216.3633	79	53.3717
	Total	81	1056.2461	1308.5391	6034.7814	4413.6875	80	197.3242
					F=3.6972			

APPENDIX D
RESULTS OF COMPUTATIONS, SUMMARIZED
DURRELL FLASH WORD SUB-TEST

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	-309.0506	2976.2500	2996.8281	1	
	W	81	4203.3437	298.1094	11214.7500	11193.6055	80	139.9201
	Total	82	4243.8086	-48.9492	14191.0000	14190.4336	81	2996.8281
					F=21.4181			
Metropolitan Listening	A	1	.0156	7.2148	2976.2500	2942.8008	1	
	W	81	489.5039	1133.9922	11214.7500	8587.7266	80	107.3466
	Total	82	489.5195	1141.2070	14191.0000	11530.5273	81	2942.8008
					F=27.4140			
Metropolitan Matching	A	1	2.0586	76.4102	2833.1875	2599.9062	1	
	W	80	862.5391	1308.3477	11130.4375	9145.8594	79	115.7704
	Total	81	864.5977	1384.7578	13963.6250	11745.7656	80	2599.9062
					F=22.4574			
Metropolitan Alphabet	A	1	35.9687	339.4258	3203.0000	2092.7500	1	
	W	80	1020.2733	1709.5273	10760.6250	7896.2227	79	99.9522
	Total	81	1056.2461	2048.9531	13963.6250	9988.9727	80	2092.7500
					F=20.9375			

APPENDIX E
RESULTS OF COMPUTATIONS, SUMMARIZED
DURRELL WORD ANALYSIS SUB-TEST

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	-434.8242	4672.0625	4677.8789	1	
	W	81	4203.3437	245.1289	13174.1875	13159.8906	80	164.4986
	Total	82	4243.8086	-189.6953	17846.2500	17837.7695	81	4677.8789
F=28.4372								
Metropolitan Listening	A	1	.0156	9.0391	4672.0625	4633.0273	1	
	W	81	489.5039	1054.4922	13174.1875	10902.5937	80	136.2824
	Total	82	489.5195	1063.5312	17846.2500	15535.6211	81	4633.0273
F=33.9958								
Metropolitan Matching	A	1	2.0586	95.4336	4419.5000	4089.7852	1	
	W	80	862.5391	1472.9570	12994.0625	10478.6953	79	132.6417
	Total	81	864.5977	1568.3906	17413.5625	14568.4805	80	4089.7852
F=30.8333								
Metropolitan Alphabet	A	1	35.9687	421.1250	4930.5000	3316.6445	1	
	W	80	1020.2773	1976.9258	12753.1250	8922.5625	70	112.9438
	Total	81	1056.2461	2398.0508	17683.6250	12239.2070	80	3316.6445
F=29.3654								

APPENDIX F
RESULTS OF COMPUTATIONS, SUMMARIZED
STANFORD WORD READING

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	-131.6211	428.0781	453.8879	1	
	W	81	4203.3437	473.6953	2532.6484	2479.2654	80	30.9908
	Total	82	4243.8086	342.0742	2960.7266	2933.1533	81	453.8879
F=14.6459								
Metropolitan Listening	A	1	.0156	2.7344	428.0781	422.2815	1	
	W	81	489.5039	519.0742	2532.6484	2404.4993	80	24.7777
	Total	82	489.5195	521.8086	2960.7266	2404.4993	81	422.2815
F=17.0428								
Metropolitan Matching	A	1	2.0586	28.6914	399.5195	353.9980	1	
	W	80	862.5391	691.4219	2504.5430	1950.2908	79	24.6872
	Total	81	864.5977	720.1133	2904.0625	2304.2888	80	353.9980
F=14.3393								
Metropolitan Alphabet	A	1	35.9687	127.9102	454.8672	239.6538	1	
	W	80	1020.2773	948.6523	2485.5234	1603.4680	79	20.2971
	Total	81	1056.2461	1076.5625	2940.3906	1843.1218	80	239.6538
F=11.8073								

APPENDIX G
RESULTS OF COMPUTATIONS, SUMMARIZED
STANFORD PARAGRAPH MEANING

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	-82.9570	170.0508	204.5803	1	
	W	81	4203.3437	879.7773	3837.4687	3653.3276	80	45.6666
	Total	82	4243.8086	796.8203	4007.5195	3857.9080	81	204.5803
					F=4.4799			
Metropolitan Listening	A	1	.0156	1.7227	170.0508	164.9084	1	
	W	81	489.5039	734.7617	3837.4687	2734.5671	80	34.1321
	Total	82	489.5195	736.4844	4007.5195	2899.4756	81	164.9084
					F=4.8244			
Metropolitan Matching	A	1	2.0586	17.5977	150.2578	113.5601	1	
	W	80	862.5391	954.4883	3795.7578	2739.5183	79	34.6774
	Total	81	864.5977	972.0859	3946.0156	2853.0784	80	113.5601
					F=3.2748			
Metropolitan Alphabet	A	1	35.9687	83.3125	192.9727	49.9277	1	
	W	80	1020.2773	1140.1523	3767.8086	2493.6973	79	31.5658
	Total	81	1056.2461	1223.4648	3960.7812	2543.6250	80	49.9277
					F=1.5817			

APPENDIX H
RESULTS OF COMPUTATIONS, SUMMARIZED
STANFORD VOCABULARY

	Sources	df	ss _x	sp	ss _y	ss' _y	df	ms' _y
Metropolitan Word Meaning	A	1	40.4648	8.1094	1.6250	.3516	1	
	W	81	4203.3437	1236.3516	6068.0391	5704.3828	80	71.3048
	Total	82	4243.8086	1244.4609	6069.6641	5704.7344	81	.3516
F=.0049								
Metropolitan Listening	A	1	.0156	- .1719	1.6250	2.1875	1	
	W	81	489.5039	745.6211	6068.0391	4932.2930	80	61.6537
	Total	82	489.5195	745.4492	6069.6641	4934.4805	81	2.1875
F=.0355								
Metropolitan Matching	A	1	2.0586	- 2.5352	3.1172	13.3242	1	
	W	80	862.5391	1135.1953	6047.0781	4553.0352	79	57.6333
	Total	81	864.5977	1132.6602	6050.1953	4566.3594	80	13.3242
F=.2312								
Metropolitan Alphabet	A	1	35.9687	- 5.3984	.8086	55.7461	1	
	W	80	1020.2773	1139.2773	6057.2539	4785.0977	79	60.5708
	Total	81	1056.2461	1133.8789	6058.0625	4840.8437	80	55.7461
F=.9203								

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