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SELECTED FACTORS RELATED TO READING SUCCESS IN THE FIRST GRADE

by

Annette Dalegowski Moorehead

A Dissertation Submitted to the Faculty of the

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For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA

GRADUATE COLLEGE

I hereby recommend that this dissertation prepared under my direction by Annette Dalegowski Moorehead

entitled Selected Factors Related to Reading Success in the First Grade

be accepted as fulfilling the dissertation requirement for the degree of Doctor of Philosophy

Pat N. Nash — 12/16/76

Dissertation Director — Date

As members of the Final Examination Committee, we certify that we have read this dissertation and agree that it may be presented for final defense.

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Final approval and acceptance of this dissertation is contingent on the candidate's adequate performance and defense thereof at the final oral examination.

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ABSTRACT

The purpose of this study was to measure the relationship of a number of factors that may contribute to predictability of success in first grade beginning reading as measured by the Reading Test of the Stanford Achievement Test.

The factors involved were: Metropolitan Readiness Tests total score, sex of child, child's chronological age when entering first grade, child's primary spoken language, composition of child's family, child's ordinal rank in the family, and socio-economic status of the child's family.

Each of the independent variables was correlated individually and collectively with the dependent variable. The raw data were analyzed on an IBM 1130 Disc Computer System utilizing the Scientific Sub-Routine Package as developed by IBM. The primary computations derived were the means, variances, and standard deviations of all independent and dependent variables. Following this series of computations, multiple linear regression analysis was performed for the set of independent and dependent variables. Level of significance was set at .05.

The following variables were significantly correlated with the Stanford Reading Test score: Metropolitan Readiness Tests total score, sex of child, child's primary spoken language, and socio-economic status of the child's family. Three

independent variables did not correlate significantly with the Stanford Reading Test score. They were: chronological age of child, composition of family, and child's ordinal rank in the family.

The number of different combinations possible of the seven variables totaled 120. Of these, 116 were statistically significant at the .01 level when correlated with the Stanford Reading Test score. If the combination contained even one significant variable, the multiple correlation coefficient of that combination was statistically significant at the .01 level. In all the combinations that contained the Metropolitan Readiness Tests total score and sex, those variables were the ones that made significant contributions to the multiple correlation coefficient. In combinations that did not contain the Metropolitan Readiness Tests total score, sex, primary language, and socio-economic status made significant contributions to the multiple correlation coefficient.

On the basis of data presented in this investigation, the following generalized conclusions were reached:

1. The Metropolitan Readiness Tests total score was a good single predictor for success in first grade reading even when an intensive synthetic phonics method of teaching reading was used.
2. Child's sex, primary language, and socio-economic status appeared to have a significant relationship to reading achievement.

3. Chronological age, family composition, and the child's ordinal rank in the family did not appear to be significantly related to reading achievement.
4. If the combinations of variables contained even one significant variable, the multiple correlation coefficient of that combination indicated significance at the .01 level with the Stanford Reading Test score.

As a result of the analysis of the data, these recommendations were suggested:

1. The use of Metropolitan Readiness Tests should be given strong consideration for determining readiness for reading.
2. Boys should be carefully diagnosed and evaluated for whatever reading skills help they may need as soon as possible.
3. Children whose primary language is other than English should be given prior vocabulary development instruction as well as concurrent vocabulary development and reading instruction.
4. Children from lower socio-economic groups should be given opportunity to expand and develop their vocabulary by providing many experiences both in and out of the classroom.
5. This study should be replicated in areas using different methods of reading instruction.

6. A follow-up of this study should be done in successive years to determine if the relationships of the seven variables change.

CHAPTER 1

INTRODUCTION

The factors that influence children's ability to learn to read are as varied as the children themselves. If previous research is reliable, there are all types and varieties of contradictions concerning factors related to reading achievement. Thorndike (in Schubert and Torgerson 1968, p. 45) long ago advanced the idea that the reading process is as involved and as complex as thinking itself. Virtually every facet of research design and learning modality has been explored; however, the body of knowledge that contributes to research design in reading and the variables affecting reading need to be expanded. For example, Gates (in Schubert and Torgerson 1968, p. 89) contended that "determination of an optimum mental age for beginning reading was difficult to arrive at because teachers vary in their ability to meet individual differences; they also differ widely in the methods, procedures, and materials they employ,"

It goes almost without saying that in our present educational environment, most learning is predicated on the ability to read, particularly at the higher levels of learning. Harrison (in Schubert and Torgerson 1968, p. 100) said, "Reading is and probably always will be the most fundamental skill taught and

used in and out of school. The first grade of the elementary school is thought of as the grade in which this skill gets its basic foundation for the later periods of growth and development."

This present research study attempted to combine several factors that the writer had observed in teaching, with a research design that brought into focus a few of the variables that had been included in numerous studies, in an attempt to demonstrate relationships and predictability in learning to read.

Statement of the Problem

This research problem attempted to measure the relationship of a number of factors that may contribute to predictability of success in first grade beginning reading as measured by the Reading Test of the Stanford Achievement Test. The factors involved were:

1. Factors as measured by the Metropolitan Readiness Tests total score.

   The Metropolitan Readiness Tests included the following six subtests:

   a. Word Meaning (a test of vocabulary)
   b. Listening (a test of comprehension of phrases and sentences)
   c. Matching (a test of visual perception which involves the recognition of similarities)

d. Alphabet (a test of recognition of 16 lower-case letters of the alphabet)

e. Numbers (a test of number knowledge)

f. Copying (a test of visual perception and motor control combination).

2. Sex of the child.

3. Chronological age.

4. Primary language spoken.

5. Composition of family.

6. Child's ordinal rank in family.

7. Socio-economic status of family.

This study attempted to demonstrate which of the above factors or combination of factors was most highly related to reading success and determine if any predictability factors could be established for beginning reading. Any combinations of these factors that were statistically significant at the .05 level were included in the analysis of data.

Hypotheses Tested

The following hypotheses were tested:

A. There is no significant relationship between reading achievement in first grade and each of the following listed factors:

1. Metropolitan Readiness Tests total score

2. Sex of the child

3. Chronological age of the child
4. Primary language spoken
5. Composition of family
6. Child's ordinal rank in family
7. Socio-economic status of child's family.

B. No combination of factors has a significantly higher relationship to reading achievement in first grade than any single factor.

Significance of the Problem

It has become increasingly evident that all children do not come to school with the same background even though most traditional first grades are taught as if the children were all starting at the same point in terms of learning potential.

The sooner the classroom teacher determines where the child is, in terms of learning potential, the sooner the teacher can adjust the program to fit the child. The factors included in this study are of the type easily accessible to most teachers. If certain factors are found to have a high relationship to reading achievement in first grade, and the child lacks those certain factors, the classroom teacher can be aware from the beginning of the school year that the child may need a different approach or different materials for learning to read.

For example, consider the factor of chronological age. In the state of Arizona, a child who reaches six years of age by December 31 of a given year may begin first grade in September of

that year. Some children begin first grade when they are five years, eight months old, regardless of their readiness for formal schooling. There is a wide variety of contradictory evidence concerning the age when a child is ready to begin to read.

A failure syndrome can be instigated when children are pushed into reading too soon or placed in a program for which they are unprepared. They may very well lack the necessary and sufficient prerequisite conditions for reading success. With the recent emphasis upon different ethnic groups (bilingual education, inner city schools, etc.), and the types of reading programs developed for them, it is important to determine the readiness (prerequisite) aspects necessary for the programs.

Procedures

Description of Sample

This research population included all of the children enrolled in the first grade at Crane Elementary School District in Yuma County, Arizona, as of March 1, 1975, who had had at least six months of reading instruction in the district but who were not repeating first grade. Approximately 260 children were enrolled in the first grades as of March 1, 1975, but only 187 were included in the scope of this study. Those 187 met the requirements of six months of reading instruction in the Crane School District and were not repeating first grade.

The Crane Elementary School District covers a suburban and agricultural area outside (small portion inside) the city limits of Yuma, Arizona, a city of approximately 50,000 people. Most socio-economic levels are represented within the district. Attempts are made to have each classroom with as normal a grouping as possible including a cross-section of socio-economic levels and ethnic groups.

Since the district includes an agricultural area, many of the children attend Crane Elementary Schools for only part of the year before moving on to another area. With its proximity to the Mexican border, many of the children come to Crane Schools directly from Mexico, and some do not stay for the entire academic school year. This in and out migration was controlled by using data only for those children in the population as of March 1, 1975, who met the criterion of having a minimum of six months of reading instruction in the Crane School District.

All nine first grade teachers of the two elementary schools of the Crane School District were included. They all used the Lippincott Basic Reading series which can be described as being a type of basal reader utilizing intensive synthetic phonics for reading instruction.

Description of Instructional Program

The child, utilizing Lippincott materials, is first taught to recognize the five vowels as representing the sound

heard at the beginning of apple, elephant, Indian, octopus, and umbrella. Auditory and visual discrimination exercises are utilized as suggested in the teacher's manual. The first consonant sound/symbol, "m," is taught in a similar way and the child is led to blend the vowel sound "a" with the sound of "m" to read the first word, "am." The next consonant sound/symbol relationship taught is "n" and the child is to blend the vowel sounds with the two consonants to learn Nan, Ann, man, men, in, on, an. Workbook exercises include writing the initial (and later, the terminal) letter for words represented by pictures. Some words are introduced as special words and must be learned by sight. In the preprimer, the special words are: a, to, the, put, and for.

The preprimer, Book A, consists of 41 pages which include 16 different letters of the alphabet and nearly 200 different words. The phoneme-grapheme sequence for Books A, B, C, and D is listed in the Appendix. There is a 44 page supplementary preprimer entitled The Red Book which consists of brief stories utilizing words made up of the 16 letters introduced in Book A.

Book B, the primer, continues with similar suggestions for teaching sound/symbol relationships. The Blue Book is a supplementary primer. Book C is the first reader with The Orange Book as a supplement, and Book D is described as a first reader, second semester. In the years that the Lippincott program has been in use in the Crane School District, approximately 30% of the first graders actually completed Book D.

All nine first grade teachers used the teacher's manuals and children's workbooks in their reading lessons. In order to assure consistency of application of suggestions in the manuals, meetings were held with the nine first grade teachers. Follow-up was pursued to insure that teaching faculty did use the Lippincott manuals and materials.

Instrumentation

The Metropolitan Readiness Tests were given to the children by their kindergarten teachers at the end of their kindergarten year, May, 1974. The Metropolitan Readiness Tests consist of six subtests: Word Meaning, Listening, Matching, Alphabet, Numbers, and Copying. The total score was used for correlation purposes in this study.

The Reading Test of the Stanford Achievement Test, Primary Level 1, Form A, was administered March 4 and 5, 1975, to all first grade children by their classroom teachers. All teachers were given instruction so as to achieve a uniform test administration.

The Warner Index (Warner, Meeker, and Eels 1960) was used as a guide for determining the socio-economic status of the child's family. Barber (1957) defined an index as indicator of a concept, which was applicable in this study.

The Shutt Primary Language Indicator Test (SPLIT) was used to determine the child's primary language, Spanish or English. The Shutt Primary Language Indicator Test was developed

after many language tests were studied, analyzed and field tested and these published tests were found to have many limitations in determining the primary language of a Spanish-speaking, bilingual student. According to the manual for the Shutt Primary Language Indicator Test (Shutt 1974, p. 104), the purpose of the test is,

> . . . to determine a subject's primary operational proficiency in English and Spanish. The test items developed from familiar concepts within the Spanish culture. Care was taken to insure that the items measured language proficiency, not intellectual knowledge or achievement. The item concepts included legendary beliefs, customs, taboos, and typical household materials and tasks common to the culture. The basic assumption, which supports the validity of the test, is that language and culture are inseparable. A second assumption is that speech is primary in language learning.

To compute reliabilities of the Shutt Primary Language Indicator Test, the Kuder-Richardson formula No. 20 (r_{tt}) was used. Following are the reliability coefficients and standard errors of measurement for each of the subtests (Shutt 1974, p. 3) for the standardization sample.

Test	r_{tt}	SE_m	$\bar{X}$
Oral Comprehension Spanish	.66	1.65	7.3
Oral Comprehension English	.82	.51	7.1
Verbal Fluency English	.74	.90	28.4
Total Test	.73	.97	14.2

The validity of the Shutt Primary Language Indicator Test was discussed in the manual as follows (Shutt 1974, p. 2):

> The validity of the SPLIT rests upon two test aims. The first is to determine how well the subject can perform in two languages, one of which [English] is customarily the dominant language of the public schools in the

United States. The SPLIT test represents the English skills required for normal functioning in the standard classroom.

The second aim is to infer from a comparison of performances based on oral comprehension in which of the two languages the subject has greater operational proficiency.

Content and construct validities form the base for the SPLIT. Criterion related validity data would be difficult to obtain because no similar instrument to determine primary language is available at the time of publication.

At the time the Shutt Primary Language Indicator Test was included in this study, the test had been purchased by a major publisher and is being field tested for a mass market all across the United States where language dominance is a classroom problem.

The Shutt Primary Language Indicator Test was administered individually to children whose permanent records indicated that another language, in addition to English, was spoken in the home.

Collection of Data

The subjects included in this study were first grade children enrolled in the schools of the Crane Elementary School District as of March 1, 1975, and who had received at least six months reading instruction at Crane District schools. Nine first grade classrooms involving 187 out of 260 children were included. Children repeating first grade and those who moved into or out of the district since the first week of September, 1974, were

excluded. The seven factors for the independent variables were obtained for each child from school permanent records. They are as follows:

1. Metropolitan Readiness Tests total score: The score was obtained from school records. The children were given the test by their kindergarten teachers at the end of their kindergarten year, May, 1974. The tests were administered at that time to help assure that all first grade classrooms would have the same number of high and low achievers, etc.
2. Sex of the child: Data were gathered from school records.
3. Chronological age of the child in months: Data were gathered from school records with age employed being that of September 1, 1974.
4. Primary spoken language of the child: Determination was language in which child is most fluent, English or Spanish, utilizing the Shutt Primary Language Indicator Test administered in March, 1975.
5. Composition of family of child: Data were secured from school records. Data were processed according to the following divisions:
   a. Mother, father, and child
   b. Mother, father, and more than one child
   c. Mother and child

d. Father and child

e. Mother and more than one child

f. Father and more than one child

g. Other (any situation not covered by above classifications).

6. Child's ordinal rank in family: Data were gathered from school records. Child's ordinal position in the family was classified as first born, second born, third born, etc.

7. Socio-economic status of child's family: The Warner Index (Warner, Meeker, and Eels 1960) was applied to data collected from school records utilizing parents' occupation(s), source of income, house type, and dwelling area.

Limitations of the Study

Any implications made can be considered only in light of the following limitations:

1. Only the Lippincott reading program, which utilizes intensive synthetic phonics, was used.
2. Only nine first grade classrooms were included.
3. Variances would exist in the classroom due to individual differences of the children and teachers.

Definition of Terms

For the purpose of this study, the following definitions were used:

Chronological age: The age of the child in months as of September 1, 1974, was the child's chronological age.

Composition of family: The composition of the family was the actual make-up of the child's family situation. It included the people with whom the child lived.

In and out migration: This term was used to denote children who entered Crane School District after the first week of school in September or those who left before March 1, 1975.

Primary language: The language the child used to express himself when he entered first grade and as shown by the Shutt Primary Language Indicator Test was considered his primary language.

Socio-economic status: The Warner Index (Warner, Meeker, and Eels 1960) was used to classify the child's family into levels such as lower lower, upper lower, lower middle, upper middle, etc. English and English (1958, p. 510) define socio-economic status as "an individual's position in a given society, as determined by wealth, occupation, and social class."

Assumptions

1. It was assumed that all first grade classes were of a normal, heterogeneous group with approximately the same ratio of boys and girls among classes, high and low achievers, and all ethnic groups of the district represented in each class.

2. It was assumed that the data collected were from a bivariate normal population.

Treatment of Data

The data gathered by this study were subjected to several statistical treatments. The following independent variables were examined:

1. Metropolitan Readiness Tests score (total raw score)
2. Sex of the child (male or female)
3. Chronological age of the child in months as of September 1, 1974
4. Primary spoken language of the child (English or Spanish)
5. Composition of family of child (people with whom the child lives)
6. Child's ordinal rank in his family (numerical rank)
7. Socio-economic status of child's family as determined by Warner Index (Warner, Meeker, and Eels 1960).

The dependent variable was the child's scaled score on the Reading Test of the Stanford Achievement Test, Primary Level 1, Form A, after six months of reading instruction in the Crane School District schools.

Each of the independent variables was correlated individually and collectively with the dependent variable. The raw data were analyzed on an IBM 1130 Disc Computer System utilizing the Scientific Sub-Routine Package as developed by IBM. Each of

the independent variables was subjected to a series of statistical analyses as shown in the Data Flow Chart (Appendix B) and described as follows.

The primary computations derived by the Scientific Sub-Routine Package were the means, variances, and standard deviations of all independent and dependent variables. Following this series of computations, multiple linear regression analysis was performed for the set of independent and dependent variables. In general the formula for computation of a multiple correlation problem can be found in such texts as Guilford (1965), Garrett (1958), Ostle (1963), and others. Garrett (1958, p. 413) presented the formula for the solution of the multiple correlation problem as:

$$R_{1(23\ldots n)} = \sqrt{1 - \frac{\sigma^2_{1.23\ldots n}}{\sigma^2_1}}$$

In addition Garrett (1958, p. 412) presented the solution of the multiple regression equation as:

$$\bar{x}_1 = b_{12.34\ldots n}x_2 + b_{13.24\ldots n}x_3 + \cdots + b_{1n.23\ldots(n-1)}x_n$$

The coefficient of multiple correlation indicated the strength of the relationship between the dependent variable and, in this instance, several independent variables.

Guilford (1965, p. 403) indicated that the two main principles in multiple correlation were "(1) a multiple correlation increases as the size of correlations between dependent and

independent variables increases, and (2) a multiple correlation increases as the size of intercorrelations of independent variables decreases."

In an attempt to comply with Guilford's stated principles, the selection of independent variables was made so as to reduce or minimize the correlation between the independent variables and to maximize the measurable validity of each of those same variables.

The 1130 Scientific Sub-Routine Package contains a built-in bridging system which permits the researcher to review the analysis of all of the independent variables versus the dependent variable individually and in combination. This is similar to the Wherry-Doolittle method described in Guilford's (1965, p. 414) text where a shrinkage formula is applied in order to determine whether a shrunken correlation is appreciably larger than a previous correlation in an attempt to gather a short predictive test battery. Guilford pointed out that adding tests and, in the instance of this study, adding additional predictive independent variables, merely contributes to error variance rather than to the strength of the predictive battery.

In addition to obtaining the above information, the Scientific Sub-Routine Package computed t values for each of the multiple correlations utilizing the general formula (Guilford 1965, p. 190):

$$t_{d_r} = (r_{12}-r_{13}) \sqrt{\frac{(N - 3)(1 + r_{23})}{2(1-r^2_{23}-r^2_{12}-r^2_{13}+2r_{23}r_{12}r_{13})}}$$

All t tests were subjected to analysis at the .05 level of significance.

The data resulting from the input information were summarized into a series of tables and matrices clearly demonstrating the quality of the relationship between the dependent and the independent variables. Discussions followed concerning the weight of the information and its significance to the possible development of a simple predictive model for the early identification of reading difficulties.

All data were collected from school records, direct parent contact, and testing. The information was organized and treated as group data once this study was in progress. All data were recorded on a data assimilation chart that is available for inspection. A copy of this chart is located in Appendix C.

CHAPTER 2

REVIEW OF LITERATURE

There have been many studies considering numerous factors related to reading in the elementary school. To examine logically the subject of the relationship of certain factors with the field of reading, the recent related literature of seven factors was subjected to a careful review. This chapter is divided into seven general areas: one for each of the seven factors selected for inclusion in this study. The seven areas are: Metropolitan Readiness Tests, sex of the child, chronological age of the child, primary language of the child, composition of family, child's ordinal rank in family, and socio-economic status of the family.

Metropolitan Readiness Tests

The Metropolitan Readiness Test has been used in elementary schools since its development in 1949. A recent study completed by Book (1974, p. 46) "to develop an index for the early identification of academically high risk children" utilized the Metropolitan Readiness Test. The test was administered to children in April of their kindergarten year. All children who scored in the first quartile were evaluated with the Slosson

Intelligence Test. Those who scored in the first quartile of section six of the Metropolitan Readiness Test (copying letters and geometric forms) were given the Bender-Gestalt Test. The children were then assigned to one of six diagnostic categories based on their scores. The results indicated a significant correlation between end of first grade reading achievement and the category to which the child was assigned ($r = .99$, p. 001). This study provided strong indications that the Metropolitan Readiness Test had predictability for first grade children.

The manual of directions for the Metropolitan Readiness Tests (Hildreth, Griffiths, and McGauvran 1969, p. 23) stated that "correlations differ across groups, being affected by the variability of the score distribution, and by other known and unknown factors."

In setting up the Hess School Readiness Scale as an "individualized screening test to detect the presence or absence of intellectual readiness to enter school" (Hess and Hahn 1974, p. 134) the Metropolitan Readiness Tests scores and Stanford Achievement Test scores were used for correlation. A correlation of .86 resulted. As in other studies, the Metropolitan Readiness Tests demonstrated ability to predict achievement.

Wallbrown, Wallbrown, and Engin (1974, p. 136) reported that the "effectiveness of the Metropolitan Readiness Test as a predictor of first grade reading achievement is well established." Their study was designed to measure the relative importance of

some of the components of the Metropolitan Readiness Tests. One of their findings suggested that the Metropolitan Readiness Tests "might be expected to predict reading success better for an instructional program that emphasizes a visual approach than for one that emphasizes an auditory approach (Wallbrown and others 1974, p. 142)."

Bolig and Fletcher (1973) reported a study in which kindergarten teacher ratings of pupils were compared with the results obtained from the Metropolitan Readiness Tests. Each kindergarten teacher rated her students for each of the six skills measured by the Metropolitan Readiness Tests utilizing a scale from 1 to 5. The teachers rated the children prior to administering the Metropolitan Readiness Tests. A year later the first grade teachers followed similar procedures when they rated their pupils for the six skills measured by the Stanford Achievement Test. These ratings were completed prior to the administration of the Stanford Achievement Test to the children. First grade success was "defined as either the Stanford Achievement Test score or the first grade rating (Bolig and Fletcher 1973, p. 639)." Results indicated that the "Metropolitan Readiness Test is more highly related with first grade success on either criterion variable than are the ratings of kindergarten teachers," at the .01 level.

Rubin (1974) described a study to determine the validity and reliability of the Metropolitan Readiness Tests at the

preschool level. While the Metropolitan Readiness Tests were standardized on pupils nearing completion of kindergarten or beginning first grade, the importance of assessing readiness skills prior to actual school attendance is gaining recognition. Rubin's (1974, p. 417) study indicated that "pre-kindergarten Metropolitan Readiness Tests scores predicted late first grade achievement in reading, spelling, and arithmetic approximately as effectively as did Metropolitan Readiness Tests scores obtained at pre-first grade level."

Lewis (1974) reported a recent study of the validity of the Metropolitan Readiness Tests. The Metropolitan Readiness Tests scores were compared with raw scores on the Lee-Clark Reading Test and with teacher ratings. Correlations of .67 and .61 respectively suggested that "scores on the Metropolitan Readiness Tests are promising indicators of student's ability to undertake first grade tasks (Lewis 1974, pp. 415-416)."

In a project "designed to help young children realize their potential through early identification and provision of remedial experiences for those with inadequate readiness skills," Lederman and Blair (1972, p. 393) reported the use of two subtests of the Metropolitan Readiness Tests. The mothers and two teachers of 28 children evaluated the children's behavior. The data indicated that "despite the presumably greater opportunity the mother has to observe the child, more valid information in

regard to his developmental status is obtained from the child's teacher (Lederman and Blair 1972, p. 394)."

In a longitudinal study, Huberty and Swan (1974) studied the relationships among different sets of variables that have been demonstrated to affect achievement. One group of children entered an experimental program at age three and the second group entered at age six. Among the many variables were the Metropolitan Readiness Tests and a test of general behavior (Wray Behavior Scales). The results indicated that "for children not having formal preschool experiences the best predictor of many types of first-grade achievement was academic readiness (Huberty and Swan 1974, p. 315)." However, for children who had had some formal preschool experience, "behavior variables were the best predictors of three achievement variables (Huberty and Swan 1974, p. 315)." It was suggested that the academic background of the children be considered when using readiness tests with incoming first graders.

These studies clearly substantiate that the Metropolitan Readiness Tests have a significant predictive validity.

Sex of the Child

Kolczynski (1973) presented a paper to the International Reading Association annual meeting in Denver in 1973. He discussed several studies that have examined the effect of sex differences on learning to read. While studies may be found to

support the biological as well as the cultural basis of sex differences, it "hardly seems possible to separate the nature-nurture variables contributing to sex differences (Kolczynski 1973, p. 2)." Kolczynski reported that, as a group, girls show significantly higher achievement in reading than boys. Preston's study was mentioned in which he compared the reading achievement of German students and American students. Comparison of mean scores showed that American girls excelled in reading over American boys while the opposite was true with the German students.

Dwyer (1973) discussed four major explanations of sex differences in reading: (1) rate or level of maturation, (2) reader content, (3) negative treatment by teachers, and (4) cultural expectations. Summarizing arguments against purely maturational explanations, Dwyer (1973, p. 457) made the statement that "despite physical maturational differences in favor of girls, girls do not uniformly excel in all subject matter areas." Her (1973, p. 458) final comment about reader content was "use of a basal reader did not give the girls a larger advantage over boys than any other form of reading instruction." Dwyer reported several studies concerning negative teacher-pupil interactions but they failed to provide support for the hypothesis that teacher sex had a significant effect on achievement. Dwyer's major explanation of sex differences centered on cultural pressures and

sex-role expectations that are reinforced by parents, teachers and (American) society in general.

Caplan and Kinsbourne (1974) studied sex differences in response to school failure. Their results indicated that sex differences in emotional response to failure could amplify the effect of the failure. They (1974, p. 51) concluded that "failing boys would probably have a more difficult time than failing girls because their socially acceptable alternatives were more rigorous than the girls' alternative." Alternatives for boys included such activities as a variety of sports or in another instance, work with their hands in mechanical skills. Caplan and Kinsbourne pointed out that girls tend to withdraw and become quiet, tending to try to become a model of perfect behavior in order to achieve some success.

Maccoby (1972) reported several aspects of sex differences. She stated that recent research continues to find female superiority in a range of verbal tasks. However, she stated that the idea that girls' superiority in verbal development is rooted in greater early childhood dependency, or due to more verbal stimulation cannot be documented from present evidence of parent-child interaction. Maccoby (1972, p. 54) also presented the idea that the effects of sex hormones on intellectual performance "will prove to be susceptible to channeling through social influence." During the early and middle childhood there is little difference in the major abilities, such as verbal, math, and

spatial aptitude, due to the sex of the child. After age 11 these sex differences do emerge. However, Maccoby generally concluded that although the hormonal influences are potentially powerful, cultural and social influence may play a larger part in intellectual sex differences.

After three years of reviewing and interpreting over 2,000 books and articles about sex differences in motivation, social behavior and intellectual ability, Maccoby and Jacklin (1974) listed several beliefs about sex differences which are supported by evidence, those which have no support and some which require more testing. Some differences which research supported are that males are more aggressive physically and verbally; girls have greater verbal ability than boys; boys excel in visual-spatial ability from adolescence on. They found no evidence to support the idea that girls are more social than boys or that girls lack motivation to achieve. Some areas produced ambiguous findings or too little evidence. Areas such as sex differences in fear and anxiety, activity, competition, and compliance are still open to further research.

Hill, Hubbs, and Verble (1974) completed a recent study which tends to support the theory that sex roles in relation to school activities are highly correlated. Their (1974, p. 206) data supported Kagan's and Kellog's conclusions that "girls view school as more related to their own sex-role, whereas boys are more ambivalent." Rubin (1972) discovered that girls are more

ready for kindergarten than boys of the same chronological age using such measures as the Metropolitan Readiness Tests and the Illinois Test of Psycholinguistic Abilities.

Johnson's (1973-1974) report mentioned several other studies that have shown significant differences favoring girls. He mentioned that Mumpower reported a 7 to 3 ratio of boys to girls with severe reading disability in clinics. Opinions of causes of sex differences in learning to read fall into two rather broad categories: (1) physiological-biological-maturational factors or (2) societal-cultural-educational factors. Johnson's results showed that sex differences in reading varied by country and may be attributed primarily to cultural rather than to physiological determinants. A study by Anderson, Hughes, and Dixon (1956) pointed out that girls tended to learn to read earlier than boys and there were fewer extreme delays in reading among girls than boys.

Primavera, Simon, and Primavera (1974, p. 213) reported on studies that concluded "self-esteem is significantly related to academic achievement, regardless of socio-economic status." The study by Primavera and others investigated further this relationship with reference to possible sex differences. The results suggested that "school plays a greater role in the affective quality of a girl's self-esteem because it is a major source of approval and praise for her"; however, "self-esteem scores for

males and females did not differ significantly from each other (Primavera and others 1974, p. 215)."

An investigation to determine whether a relationship exists between achievement in reading and language was reported by Callaway, Jerolds, and Gwaltney (1974). The results showed no significant differences in reading achievement between males and females but females scored significantly higher than males in language achievement. A study by Hartlage (1974, p. 7) yielded somewhat different results in that his findings suggested that one might predict initial reading skills success by "using a given reading method, on the basis of sex and screening scale profiles of each child."

In conclusion it appears that there is a great divergence of opinion on the importance of the child's sex and how it affects his ability to learn to read. It may be that error in measurement and the inability to control contaminants in studied variables contribute to the differences in reported results.

Chronological Age of the Child

An early study by Durkin (1961) attempted to discover some of the more significant factors related to a child's learning to read at an early age, in this instance prior to first grade. These children, even at a young age, demonstrated exceptionally good memories, ability to concentrate, curiousness, self-reliance, and a high regard for reading. Parental reports indicated that early readers walked and talked at earlier ages.

Parents of these children were positive, concerned about reading and spent time answering questions to reinforce the aspect of curiosity. Whether this prevails across the general population is another matter and evidence at best on early readers contains a great deal of speculative material.

In a paper presented at the sixteenth annual meeting of the International Reading Association at Atlantic City in April of 1971, Durkin (1971) reported some of her findings while reviewing pertinent literature to place her program in a larger context. Her program started with two groups of four-year-olds and continued through their kindergarten year. She found that most reports on children reading at an early age failed to state in sufficient detail exactly what was done and failed to stay with pre-first grade readers long enough to evaluate future effects of early reading. She also reported that many schools are not ready to deal with early starts in reading.

Kerr (1973, p. 232) reported that "the evidence from research demonstrates clearly that the younger children in any school year group are at a disadvantage compared with the older children." Kerr (1973, p. 233) suggested more studies to determine if achievement is affected by the month of birth or if "achievement is solely related to age within a grade."

Age of learning to read was widely distributed despite the fact that most of the children in the sample were of superior intelligence in the study by Anderson and others (1956). Age of

learning to read was correlated with intelligence quotients recorded for first grade (.57 for girls and .54 for boys), and age of learning to read was correlated with reading achievement in the sixth grade (.67 for girls and .65 for boys) by Anderson and others. Morphett and Washburne (1931) reported that children needed a mental age of 6-0 or 6-6 for successful reading. However, Gates (1937) found that varying conditions in the classroom affected the optimum mental age for beginning to read. Gates concluded that children in a classroom in which the program is adjusted to individual differences and in which the teacher utilizes diagnostic materials will perform better than children in a classroom which utilizes mass methods.

Although studies indicate that other factors besides chronological age affect reading achievement, Hampleman (1959, p. 331) stated that pupils who are older chronologically should "be somewhat more advanced in mental age, have more experiences to assist with readiness, and have better eye coordination." Results of Hampleman's (1959, pp. 332-333) data show that "those children who started school at age six years, four months or more, as a group are superior in reading achievement at the sixth-grade level to their younger classmates."

Hall's (1963) study of entrance age and achievement noted a trend toward raising the minimum school entry age. Most parental pressure, however, was directed toward lowering the entrance age. Among possible considerations must be the type of program

the pupil will encounter on entering school. Hall examined data from pupils' permanent records indicating 801 of approximately 12,800 elementary-school pupils had been retained in a certain district at some time during their school career. Pupils were classified as overage if they were more than six years, six months of age at entrance and underage if less than six years, six months. Of those retained sometime during their school career, 79% were underage (less than six years, six months, at entrance and 21% were overage (more than six years, six months).

Halliwell and Stein (1964) compared the achievement of early and late school starters in different subject matter areas in fourth and fifth grades. The findings in their investigation was in agreement with several others in that "pupils who entered school early were significantly poorer in achievement than were pupils who entered school later (Halliwell and Stein 1964, p. 638)."

In conclusion, it appears that studies dealing with the ages of young children entering school and/or learning to read must consider other factors as well as age. These factors are such things as socio-economic status, background of experience, family concern for and emphasis on learning to read.

Primary Language of the Child

Hansen (1974, p. 276) quoted Stauffer's statement: "It is commonly accepted that language is the instrument that, better than any other, enables persons both to develop and to

participate in their culture," and added this comment: "Since language is the major medium of instruction, verbal differences may create a serious barrier to all forms of educational achievement."

The aspects of language development in learning to read have been discussed in several papers, and a recent dissertation at The University of Arizona by Van Metre in 1972 found that the main differences between children who scored high and those who scored low on measured reading achievement were not due to bilingual and/or monolingual differences. Cox (1971) in another dissertation at The University of Arizona concluded that there is a difference in the language skills of monolinguals in spontaneous expression, in the presentation of dictation, and in personal authorship. Saldate (1972) studied language usage of Mexican-American students in relation to high and low achievement. He found that there were no significant differences in language usage in relation to achievement in the two groups.

Fowler (1973) reported a study for predicting reading achievement of Spanish-speaking first grade children. The Brengelmann-Manning Linguistic Capacity Index was used. Conclusions were:

> The ability to recognize noun, verb, and adjective forms, and combined elements of both English and syntax knowledge, the ability to understand English function words, word order, and inflectional constructions, and to distinguish pairs of sounds contrasted in English as measured by the Brengelmann-Manning Linguistic

> Capacity Index is associated with reading achievement of Spanish-speaking first grade boys and girls. The results are indicative of the supposition that receptive language capacity is necessary for beginning reading instruction (Fowler 1973, pp. 9-10).

Melear (1974, p. 508) described the development of an informal language inventory utilizing a child's own drawing; it was planned in conjunction with a program "designed to stimulate the development of language in elementary school children who display a lack of standard English." Most of the children were bilingual and from a low socio-economic status. The results of the study corresponded to other studies on children's language ability which showed that children from high socio-economic levels tended to have superior oral vocabulary, to use longer sentences, and to use more complex language.

In an article entitled, "Mexican-American Bilingualism and English Language Development," Garcia (1974, p. 468) reported that "only 5.5% of the Chicano students receive some form of English as a second language instruction." Garcia reviewed significant research concerning the effects of bilingualism on language development. Where bilinguals were instructed in their weaker language, school progress was affected adversely. "In studies where the bilingual's second language was not the weaker language, and where the bilingual could develop both languages fully, the bilingual's language development was not impaired (Garcia 1974, p. 469)." It was mentioned that factors related to

the bilingual child's socio-evironmental background should be considered also.

Reyes (1973, p. 27) authored an article, "Another Look at Bilingualism," in which he stated,

> . . . the assumption that the bilingual Latino student will learn content when it is taught in Spanish depends upon language development considerations that have not yet been supported by the research . . . . Learning will be facilitated and cognitive development promoted to the degree that one's language is able to carry the necessary load of communication.

Yawkey and others (1974) attempted to explain some of the difficulties Mexican-American children have in terms of learning English. One difficulty lies in not hearing many customary word endings in English, since a Spanish word may end in one of 10 ways. Some English sounds are non-existent in Spanish and may be "tuned-out." Vowel sounds can be confusing and "s" words can cause problems. All words that begin with "s" are followed by a vowel in Spanish. In English, either vowels or consonants may follow the "s." An additional problem is due to different breath levels that are required to speak Spanish that may cause enunciation problems for the bilingual child. Included in the article are several curriculum suggestions for teaching oral English to young Mexican-Americans.

In discussing some pronunciation and linguistic problems of Spanish-speaking children in Anglo classrooms, Axelrod (1974, p. 204) stated that "no person can master a foreign language without good old-fashioned drill in that language's speech

patterns." He encouraged teachers not to treat a linguistic problem as if it were a pronunciation problem and vice versa. Two charts were provided to aid in determining whether error is due to pronunciation problems or to linguistic errors.

The study by Milner (1951) further indicated that the home environment had something to do with reading in respect to the quality of verbal interaction between children who scored high and low on reading tests. The high scoring children, as an example, had an opportunity for stronger emotional interaction with their parents. This was particularly true when the interaction was an overt one, such as hugs and kisses, as well as verbal approval.

Determination of language dominance has been the subject for several studies. Greene and Zirkel (1974) reported a study involving Spanish-speaking first graders and the use of parallel tests of ability in two languages. The Oral Vocabulary subtest of the Inter-American Test of General Abilities was used. After random division into two groups, the children were given the test first in Spanish, next its alternate form in English. The other group received the same tests but in reverse order. Analysis of data revealed that "difference in languages had a significant effect, but that practice effect and interaction were not significant factors (Greene and Zirkel 1974, p. 54)." However, it was emphasized that "parallel tests of ability in two languages is suggested as an indicator rather than the measure of language dominance (Greene and Zirkel 1974, p. 55)."

Hepworth (1974) attempted to evaluate the importance of the "critical period" for second-language learning. The critical period is when second-language learning overlaps primary language learning. The age limitations of the critical period are from two to 13 or the early teens. It is believed that a "matrix of language skills is fixed by the end of the period (Hepworth 1974, p. 281)." "One can infer that during the 'critical period' children can learn a second language with little effort (Hepworth 1974, p. 273)." Hepworth went on to explain the difference between co-ordinate and compound systems of learning a second language and how there can be two or more levels of bilingualism in one individual.

Shepherd (1974, p. 544) reported his study of oral language performance and reading instruction which utilized "length and complexity of sentences used and the amount of language uttered." His results supported other research that disadvantaged children have smaller vocabularies and their language development is less than middle class white or black children.

Brekke and Clark (1974) utilized the Piaget clinical interview to observe language acquisition. They (1974,p. 291) stated that "the Genevan research has shown that language is established by the end of the sensorimotor period." Depending on the child's age, sentences could be repeated correctly, but comprehension in acting them out was not correct.

An article entitled "The Overlooked in Language Acquisition" by Corcoran, Prescott, and Johnson (1974, p. 289) stressed that "words denoting spatial orientation cannot be presumed to have meaning for the four to seven-year-old child." There must be motor involvement along with verbal presentation to insure assimilation.

Morgan's (1974) research with disadvantaged children in New Orleans supported the above findings by Corcoran and others. The children were unfamiliar with words such as "where," "your favorite game," and even "wishes." Pictures were frequently misinterpreted unless they were extremely realistic. Several questions were answered literally and some children appeared unable to tell the examiner how a character "felt."

Foulke (1974, p. 311) presented a paper dealing with characteristics of language impaired school age children; "delayed language development may be caused by hearing loss, mental retardation, neurological disorder, or various other medical conditions." In discussing skills needed for reading, she (1974, p. 312) stated, "A child needs to be at ease with the spoken language, which can be especially difficult for a child from a bilingual home."

In another study Andersson (1974, p. 78) suggested that the "extension of bilingual-bicultural education into the home, provided the families are receptive, holds out the greatest hope for education." His (1974, p. 78) suggestion is based on taking

advantage of the "prodigious learning potential of children between birth and age five."

In describing language characteristics of Mexican-American children and implications for assessment, Matluck and Mace (1973, p. 365) pointed out that the most critical of problems is the "loss of lexical and grammatical signals through underdeveloped perception of English phonology." This, in turn, affects the child's "ability to learn as fast or as efficiently as the monolingual English-speaking child in every area of learning (Matluck and Mace 1973, p. 365)."

When one reviews the literature dealing with language development, the relationships of language to achievement are evident. This seems to be particularly true when young children entering first grade have reading difficulties compounded by linguistic problems. The statement by Stauffer (in Hansen 1974) referred to earlier concerning language as the major medium of instruction and its various important ramifications become vitally evident.

Composition of Family

The composition of the family has been studied by various authors in relationship to school achievement and behavior. Their findings have been subject to wide variation in results with numerous studies on fatherless families and the effects on young males.

An article by Welsh (1973, p. 166) stated that "our culture places high value on a two-parent society." However, according to a statement by the Women's Bureau of the United States Department of Labor in 1970, "5.4 million families in the United States are headed by a woman (in Welsh 1973, p. 167)." Patterson (1973) reported some problems faced by families headed by a woman. Almost one-third of the families headed by women lived in poverty. Discrimination was found in job-training programs and the welfare laws of some states impose a special burden. Finding adequate housing at affordable prices was another problem for these families.

"Over seven million children under eighteen years of age are living with their mothers and without their fathers," according to an article by Herzog and Sudia (1972, p. 175). Their review of research was limited to studies of boys growing up in fatherless homes. In most cases the studies did not control adequately for socio-economic status. They (1972, p. 177) stated that studies give "unequivocal support to the proposition that family functioning and climate, and the kind of supervision given to a child, have much more influence on his behavior than the number of parents in the home."

Vockell and Bennett (1972, p. 162) reported that their review of research indicated that "the size of a family is likely to be a significant factor" when they studied effects of birth

order and the incidence of learning disabilities. However, their results did not provide support for this area.

Goldstein and others (1970) examined emotional and social factors related to learning problems. They investigated the family patterns and the school performance of emotionally disturbed boys ranging in age from six to 12. Parental ambitiousness was related to school performance. However, there were three sets of analyses which produced different results since the techniques were designed for different purposes.

Eiduson, Cohen, and Alexander (1973) examined several alternatives in child rearing. Their observations included families from rural and urban communes, single middle-class mothers and "unmarried marrieds." The child-rearing practices, values and beliefs of the counter-culture groups were compared with those of two-parent nuclear families. They (1973, p. 729) found that "many of the parental behaviors and values in regard to children that had been attributed to the counter-cultures in literature, journalism, and popular myth, were in actuality also found to be characteristic of parents living in the nuclear two-parent family today." Some examples noted were: breast feeding, fostering independence and self-reliance, and valuing meaningful interpersonal relationships. However, many questions were raised as to what might be the impact of other values and practices such as multiple caretaking, non-differentiated roles of father and mother in parenting, changes in health habits, and so on.

In another report, Eiduson (1974) reported the arrangements made to study children in "emergent" family styles. Although the group may represent only one or two percent of young people between the ages of 18 and 30, their influence appears to be reflected in changing trends in art, movies, and fashion. "Ideologies and beliefs often seem to be better crystallized and more focused in counter-culture households than they are in 'straight' families, where they appear in more amorphous or ambiguous form (Eiduson 1974, p. 6)." She went on, "because of their predictive potential, then, the counter-cultures are significant and valuable to study."

A recent article in U. S. News and World Report (1974) presented some statistics concerning families headed by women. According to the United States Census Bureau these families are increasing both in number and in proportion. These families lag behind in family income and are more likely to be living in poverty. More of the women heading these families are either single or divorced, and even though the median age indicates they are younger, they are also better educated than in the past.

Atkinson and Ogston (1974, p. 213) studied "the effect of father absence on male children in the home and school." The behavior of father absent male children in the home and at school was compared to the behavior of father present male children. Questionnaires were completed by the subjects (ages eight to 16) and mothers, and data were obtained from their schools. It

appeared, on the basis of their results, that "the behavior of children without fathers is neither more nor less deviant than that of children having fathers. They performed as well scholastically, generally participated in as many activities, and appeared to be equally cooperative and responsible around the home (Atkinson and Ogston 1974, p. 220)."

Santrock (1972) discussed several studies concerning the effects of father absence. Several studies were limited due to lack of knowledge of when the father became absent. Santrock's study was concerned with both the type of father absence and the child's age at the time the father became absent. Santrock's (1972, p. 455) results indicated that,

> While father absence due to divorce, desertion, or separation had the most negative influence in the initial two years of the child's life for boys and girls, father absence due to death was the most detrimental when it occurred in the 6-9 period of the boy's life. Father-absent boys consistently performed more poorly than father-absent girls and father-present boys. Remarriage of boys' mothers who were divorced in the initial five years of the son's life had a positive influence.

Larsen and others (1973) utilized an interdisciplinary approach in studying factors in reading achievement. In examining 100 children who had been referred to a learning disabilities group, "several factors were found to distinguish significantly between subgroups (Larsen and others 1973, p. 636)." There was a "trend for the high sibling group to include more low-achieving readers than the low sibling group (Larsen and others 1973, p. 641)." To be in the high sibling group, subjects had to have

three or more siblings. Few disadvantaged children were included in the study, but the children who were from "more limited economic circumstances included proportionately more who lagged in oral reading (Larsen and others 1973, p. 642)."

Sheldon and Carrillo (1952) found in their study that there is a tendency for fewer of the children to be good readers as family size increases. They found this trend to be consistent with other research.

American society in the past has placed great emphasis on the two-parent family. However, if observations from literature are an indication, the single parent family is on the increase and teaching staff need to be aware of the trends and their implications for instruction. Most studies have dealt with the behavior and achievement of fatherless boys, and it seems apparent that studies need to be completed on other family constellations.

Child's Ordinal Rank in Family

One of the foremost psychologists, Dr. Alfred Adler, spent a considerable amount of time studying the structure and nature of family relationships. An article by Hillman (1972, p. 20) contained the remark that "Alfred Adler was probably the first psychologist to suggest that an individual's position in his family constellation is a major factor in his development." Adlerians hold the view that the first child tends to direct his behavior toward being first or best. They believe the second

born would tend to avoid developing skills in areas of success of the first born. Hillman (1972, p. 21) stressed that it is "not the child's birth order per se which influences his personality development, but rather the way he interprets his position." While Hillman's article was directed toward elementary school counselors and their understanding of an individual child, the classroom teacher can also make use of such information in better understanding a child's behavior.

Aldous (1973) examined many family background factors related to originality in children. Ordinal position was one of these factors. She (1973, p. 188) concluded in her study that, "ordinal position alone did not differentiate the sample, but there was significant interaction between ordinal position and sex . . . . Oldest sons scored highest."

Sheldon and Carrillo (1952) further noted that the ordinal position of the child seemed to affect reading, with the earlier the ordinal position, the higher the percentage of good readers.

Vockell and Bennett (1972, p. 162) stated in their report that a study by Greer and Whitley found a "highly significant relationship between ordinal position of birth and the incidence of learning disabilities among school age children." The study by Vockell and Bennett replicated the Greer and Whitley study but expanded upon it. Their results provided "no support for the hypothesis that birth order or sex of siblings are related to the

incidence of learning disabilities (Vockell and Bennett 1972, p. 164)." They believed their different results could have been the result of changes in birth rate or differences in analysis of the data.

Zajonc (1975) reported a study of birth order and intelligence involving over 380,000 19-year-old men. According to that study, the brightest children came from the smallest families and last-born children had lower I.Q.'s that first borns. Zajonc suggested that many researchers forget that brothers and sisters play an important role in a child's early environment. Zajonc presented a hypothetical formula to estimate a child's intellect and to show how other children in a family, and the length of time between the births of the children may influence the family's intellectual level.

The purpose of a study by Bragg, Ostrowski, and Finley (1973, p. 351) was "to determine whether birth order or age of target person was the determining factor in the differential use of persuasive arguments." The conclusion was reached that data in the study suggested that the age of the target rather than the birth order of the subject was the "major determinant of differences in the use of persuasive appeals (Bragg and others 1973, p. 354)."

Kahn (1974, p. 3) in listing factors related to achievement in reading, considered place in the family to be important;

the "first born, especially first-born girl, or only child seems most likely to achieve academically."

Glass, Neulinger, and Brim (1974) studied the effects of birth order on reading ability and educational aspiration using over 2,500 tenth and twelfth grade public high school students as subjects. On tests of reading ability the first and only borns were superior to later borns. The finding that first and only children had higher educational aspirations than later-born children was true only for families of higher socio-economic background. The results were due mainly to the differences between first and only children and third-born children. Second-borns were similar to first and only children and better on the reading test than third borns. Birth order effects reported in previous studies did not occur for persons coming from a lower socio-economic background. "The results were interpreted in terms of parental attitudes toward rearing early- versus later-born children (Glass and others 1974, p. 807)."

In conclusion it must be stated that there has been a considerable amount of research on the family constellation and ordinal position. Even though some research is in conflict the methodology may be at fault rather than a lack of relationship between ordinal position and academic achievement. The preponderance of data at least indicates some relationship between ordinal rank and achievement.

Socio-Economic Status of the Family

The socio-economic status of the family prior to the child's learning to read has been researched in studies by Durkin (1961), Milner (1951), Plessas and Oakes (1964), and Sheldon and Carrillo (1952). Plessas and Oakes (1964) found that early readers, as an example, had fathers whose occupations were mainly clerical or professional. Sheldon and Carrillo (1952) reported that the occupation of the father had a relationship to reading achievement with more good readers tending to have fathers in professional or managerial positions. Plessas and Oakes (1964) stated that the influence of the home as a significant factor in readiness to read has been well established in research. Good readers frequently come from homes where parents have attained high educational levels (Plessas and Oakes 1964, Sheldon and Carrillo 1952).

Hollingshead (1949, p. 330) stated that "the class to which a child belongs is a really significant factor in his relations with the school." Barber (1957, p. 283) pointed out that "wherever they exist, schools have a connection with the system of social stratification."

In discussing "reading processes and the disadvantaged," Swick (1973, p. 33) stated that each of the sense processes, including touching, listening, smelling, seeing, and speaking, "is a part of the general communicative process"; he went on to declare that since "reading is a basic form of communication . . .

it is linked to the sensual development of the child." Children from the lower socio-economic levels generally have fewer listening opportunities, fewer visual opportunities, and deprivation of other sense processes. This deprivation can have a negative effect on general communicative development.

Eley (1974) reported results of his study coincided with others in that when full instructions were given at the beginning, lower socio-economic status children performed equally well under both material and signal reinforcers. If prior instructions were minimal, lower socio-economic status children performed better with material reinforcers. Upper socio-economic status children performed "equally well under all instructions versus reinforcement conditions (Eley 1974, p. 834)."

Brown (1967, p. C-4) utilized the father's education and occupation to develop an index for socio-economic status in his study. His data suggested that "occupation is a more reliable indicator of socio-economic status than is education."

A study by Wulff (1974, p. 309) of cognitive development in disadvantaged students indicated a "significant, positive correlation between general academic ability and reading achievement and the ability to generalize." The study involved disadvantaged rural and urban students and advantaged suburban students. The means and standard deviations of all variables were fairly close for both the disadvantaged rural and the advantaged suburban students. "The disadvantaged urban students

had a wide range of scores in all variables (Wulff 1974, p. 309)."

Jantz (1974) studied the effects of sex, race, I.Q., and socio-economic status on reading scores. Both level of performance and gain in performance were examined. The findings indicated that for this study high socio-economic status pupils scored significantly higher than low socio-economic status pupils for the levels of performance in reading. However, no significant effect of socio-economic status was found for the gain in performance of reading from one year's score to the next.

Pishkin and Willis (1974) examined the factors of age, sex, and socio-economic status in concept identification. They believed that previous concept formation studies were inconclusive because language appeared to be the actual factor investigated. The concept identification task used in this study required minimal language comprehension. In summary, "Although there were no overall class differences, middle class males were reliably superior to middle class females; lower class kindergarten subjects outperformed the middle class group, and kindergarten females showed deficit when compared to peer males (Pishkin and Willis 1974, p. 89)."

The preponderance of data in studying socio-economic status and its relationship to achievement and reading indicates that the higher the socio-economic status generally the better one may predict success, and conversely the lower the

socio-economic status ranges, the greater difficulty the student has in school.

Summary

This chapter has reviewed some of the pertinent literature that describes a number of variables that can affect a child's ability to read. The Metropolitan Readiness Tests have been shown to have relatively high predictive validity with first grade success in reading.

The sex of children has been researched in a great many studies related to learning to read and success in general in school. These studies have, in some cases, demonstrated that boys are slower to learn to read and in others the evidence has been inconclusive. Whether or not sex differences play a major role in learning to read, and if so to what extent, remains to be further studied.

Studies that research the child's age in relation to ease of learning and/or achievement need to consider other factors as well as age, such as socio-economic status, prior experiences and family concern for the importance of reading.

When the child's primary language (Spanish or English) is considered in relation to reading, there seems to be a significant relationship between reading and primary language. It does seem obvious, aside from research, that a child cannot learn to read in a second language until he has mastered at least some of the rudiments of that language.

American society has placed great emphasis on the two parent family in the past. However, the single parent family structure is on the increase and is compounded by societal mobility. There are significant needs in research associated with children in the single parent family and school achievement and reading.

The child's ordinal position in the family and the ability to read has been researched by a number of authors. The preponderance of data indicated that there is some relationship between ordinal rank and school achievement.

Socio-economic status and its relationship has been researched by a considerable number of authors. A summary of their research seems to indicate that the higher the socio-economic status generally the better one may predict success in reading and general school achievement. Conversely the lower the socio-economic status the more difficulty the child may be expected to encounter.

CHAPTER 3

PRESENTATION AND ANALYSIS OF DATA

Analysis of Sample

All of the children enrolled in the first grades in Crane Elementary School District as of March 1, 1975, who had had at least six months of reading instruction in the district but who were not repeating first grade, were included in this study. Of the 260 children enrolled in the first grades as of March 1, 1975, 187 met the requirements necessary to participate. There was a fairly even division by sex. Ninety-five were boys and 92 were girls. There were 32 whose primary spoken language was Spanish and 155 who had English as the primary spoken language. The age range was from 68 months to 87 months. The great majority of children (149) were from families consisting of two parents and more than one child. Most of the children were either first or second born with the range extending to eighth born. The socio-economic status of most of the children was middle or lower class. The Crane School District is a suburban and rural area outside the city limits of a city with a population in excess of 40,000.

Tables 1 to 9, pages 53 to 59, present graphically the number and percentage of students in this study according to the

various groups into which they were divided for statistical purposes.

Table 1 indicates the fairly even distribution by sex of the children in this study with 95 being male and 92 being female.

Table 2 presents the number and percentage of students in the study by chronological age in months as of September 1, 1974. In Arizona, children may enter first grade in September of the year in which they become six. Some children with December birthdays may be as young as 68 months (5 years, 8 months). Hall (1963) classified children as underage if they entered first grade at less than six years, six months and overage if more than six years, six months. According to his study, of those children retained at some time during their school career, 79% had been underage at entrance and 21% had been overage. In this study, approximately 68% of the children were six years, five months or less (77 months or less) on September 1, 1974, when they entered first grade. Nearly 11% were six years, six months (78 months) and only 21% could be classified as overage according to Hall's definition of more than six years, six months at entrance (79 months or more). Such a large percentage concentrated at the younger end of the possible age range for first grade may have influenced results.

Table 1. Number and Percentage of Students in Study by Sex

Sex	N	Percentage
Male	95	50.8
Female	92	49.2
Total	187	100.0

Table 2. Number and Percentage of Students in Study by Chronological Age

Age in Months on 9-1-74	N	Percentage
68 to 70	25	13.4
71 to 73	43	23.0
74 to 76	44	23.5
77 to 79	48	25.7
80 to 82	17	9.1
83 to 85	9	4.8
86 to 88	1	0.5
Total	187	100.0

Table 3 illustrates the number and percentage of students in this study by primary language. Of the 187 children in this study, 155 or 82.9% were found to have English as their primary language. Thirty-two or 17.1% were ascertained to have Spanish as their primary spoken language. This was determined from results of the Shutt Primary Language Indicator Test. The oral English ability of the children whose primary language is Spanish ranged from extremely limited English to some who were approaching proficiency in speaking either language.

Table 4 indicates the number and percentage of students in the study by sex and primary language. English-speaking females had the largest representation, 80 or 42.8%. Next were 75 English-speaking males comprising 40.1% of the children in the study. Twenty, or slightly over 10%, were Spanish-speaking males, and only 12, or 6.4%, were Spanish-speaking females.

Table 5, page 56, presents the number and percentage of students in the study according to family composition. Approximately 80% of the children lived in a family consisting of a mother, a father, and more than one child. An additional 10% had a family situation of a mother, father, and only one child. Eight percent were from fatherless homes and 1.6% from motherless homes.

Table 6, also on page 56, indicates the number and percentage of the students in the study by birth order. Seventy-nine or 42.2% of the pupils were first-born or only children,

Table 3. Number and Percentage of Students in Study by Primary Language

Primary Language	N	Percentage
Spanish	32	17.1
English	155	82.9
Total	187	100.0

Table 4. Number and Percentage of Students in Study by Sex and Primary Language

Sex and Primary Language	N	Percentage
Male Spanish	20	10.7
Female Spanish	12	6.4
Male English	75	40.1
Female English	80	42.8
Total	187	100.0

Table 5. Number and Percentage of Students in Study by Family Composition

Family Composition	N	Percentage
Mother, father, one child	18	9.6
Mother, father, children	149	79.7
Mother and one child	4	2.1
Father and one child	1	.5
Mother and children	12	6.4
Father and children	2	1.1
Other	1	.5
Total	187	99.9

Table 6. Number and Percentage of Students in Study by Birth Order

Birth Order	N	Percentage
First born (or only)	79	42.2
Second born	46	24.6
Third born	29	15.5
Fourth born	21	11.2
Fifth born	5	2.7
Sixth born	5	2.7
Eighth born	2	1.1
Total	187	100.0

and an additional 24.6% or 46 were second-born. Twenty-nine, or nearly 16%, were third-born and 21, or 11.2%, were fourth-born. Only 6.5% make up the rest of the range to eighth-born.

The pupils in this study were classified for socio-economic status according to the Warner Index (Warner, Meeker, and Eels 1960). Items utilized for classification were parent's occupation(s), source of income, and dwelling area. Results of the classification are shown in Table 7. Approximately 44% could be considered upper or lower middle class, and 56% fit the classification for upper lower and lower lower class.

In addition, Table 8 shows the number of students in each socio-economic class by sex. Table 9 illustrates the number of students in each socio-economic class by primary language. Looking at the number of males and females represented in each socio-economic class, it is apparent that the number of males and females are distributed evenly. However, when viewing the distribution of children by primary spoken language in each socio-economic class, the majority of English-speaking children are in the middle classes while all but one of the Spanish-speaking children fall into the lower classes (see Table 9, page 59).

Results of Hypotheses Tested

The first hypothesis tested in this study was Hypothesis A which stated: There is no significant relationship between reading achievement in first grade and each of the following listed factors:

Table 7. Number and Percentage of Students in Study by Socio-Economic Status

Socio-Economic Status	N	Percentage
Upper middle	8	4.3
Lower middle	75	40.1
Upper lower	52	27.8
Lower lower	52	27.8
Total	187	100.0

Table 8. Number of Students in Each Socio-Economic Class by Sex

Socio-Economic Class	Male	Female
Upper middle	4	4
Lower middle	36	39
Upper lower	26	26
Lower lower	29	23
Total	95	92

Table 9. Number of Students in Each Socio-Economic Class by Primary Language

Socio-Economic Class	Spanish	English
Upper middle	0	8
Lower middle	1	74
Upper lower	7	45
Lower lower	24	28
Total	32	155

1. Metropolitan Readiness Tests total score
2. Sex of the child
3. Chronological age of the child
4. Primary language spoken
5. Composition of family
6. Child's ordinal rank in family
7. Socio-economic status of child's family

The seven factors listed in the hypothesis became the seven independent variables for this study. The Stanford Reading Test, Primary Level 1, Form A, was administered March 4 and 5, 1975, and the child's scaled score on that test was the dependent variable. Each independent variable was correlated individually with the dependent variable. The level of significance was set at .05.

The null Hypothesis A could not be retained due to certain independent variables indicating a significant relationship with the dependent variable. The following variables were significantly correlated with the Stanford Reading Test score: Metropolitan Readiness Tests total score, sex of the child, primary language spoken, and socio-economic status of the child's family. Three independent variables did not correlate significantly with the Stanford Reading Test score. They were: chronological age of the child, composition of family, and child's ordinal rank in the family.

The second hypothesis tested in this study was Hypothesis B which stated: No combination of factors has a significantly higher relationship to reading achievement in first grade than any single factor.

The null Hypothesis B could not be retained on the basis of this study as there were certain combinations that had a higher relationship to reading achievement in first grade than some of the single factors. The highest correlation (.6692) included the factors of Metropolitan Readiness Tests total score, child's sex, primary language, family composition, ordinal rank, and socio-economic status. The highest four-factor combination with a correlation of .6652 consisted of Metropolitan Readiness Tests total score, child's sex, family composition, and ordinal rank. The higest three-factor combination of Metropolitan Readiness Tests total score, child's sex, and ordinal rank had a

correlation of .6588. The highest two-factor combination consisted of the Metropolitan Readiness Tests total score and ordinal rank. All of the combinations and the correlations may be seen in Tables 23 to 28, pages 86, 88, 92, 96, 99, and 100.

Analysis of Hypothesis A

The null Hypothesis A stated: There is no significant relationship between reading achievement in first grade and each of the following listed factors:

1. Metropolitan Readiness Tests total score
2. Sex of the child
3. Chronological age of the child
4. Primary language spoken
5. Composition of the family
6. Child's ordinal rank in the family
7. Socio-economic status of the child's family

This study followed the procedure described in Chapter 1. The information was organized and treated as group data once the study was in progress. The data resulting from the input information were summarized into a series of tables and matrices clearly demonstrating the quality of the relationship between the dependent and the independent variables.

The seven independent variables were the seven factors listed in Hypothesis A. The dependent variable was the child's scaled score on the Stanford Reading Test, Primary Level 1,

Form A, which was administered March 4 and 5, 1975, to the first grade children by their classroom teachers. Each of the independent variables was correlated individually with the dependent variable. Table 10 presents the correlations of the independent variables with the dependent variables. While the .05 level of significance was used for analysis of data, several variables were significant at the .01 level.

Looking at Table 10, one can see that the null Hypothesis A could not be retained. Several independent variables indicated a significant relationship with the dependent variable.

1. The Metropolitan Readiness Tests (MRT) total score was significantly correlated with the Stanford Reading Test score with a correlation of .59 which was significant at the .01 level.
2. The child's sex, with a correlation of .23 with the Stanford Reading Test score, was also significant at the .01 level.
3. The chronological age of the child was not significantly correlated with the child's Stanford Reading Test score in this study.
4. The child's primary language indicated a correlation of .38 with the Stanford Reading Test score which was significant at the .01 level.
5. The family composition of the child did not show a significant correlation with the Stanford Reading Test score.

Table 10. Correlations of Independent and Dependent Variables (N = 187)

Independent Variables	Dependent Variable Stanford Reading Test	
MRT total score	.59*	
Sex	.23*	
Chronological age	.09	NS**
Primary language	.38*	
Family composition	.12	NS**
Ordinal rank	.002	NS**
Socio-economic status	.37*	

*Significant at .01 level.

**Not significant at .05 level.

6. The ordinal rank of the child in the family was not significantly correlated with the child's Stanford Reading Test score in this study.
7. The socio-economic status of the child's family was significantly correlated with the Stanford Reading Test score at the .01 level with a correlation of .37.

The Metropolitan Readiness Tests total score, sex of the child, primary spoken language, and socio-economic status were significantly correlated with the Stanford Reading Test score. The child's chronological age, family composition, and ordinal

rank showed no significant correlation with the dependent variable, the Stanford Reading Test score. Therefore, Hypothesis A-1, A-2, A-4, and A-7 would have to be rejected because significant correlations were found for those factors.

Looking at Table 11, which presents the t statistics of the independent and dependent variables, one can readily see which results exceeded ±1.96 for the .05 level of significance and which exceeded ±2.58 to indicate the .01 level of significance, and these were Metropolitan Readiness Tests total score, sex of the child, primary language, and socio-economic status of the child's family. The table is arranged in the same order as Table 10, page 63, and its data support the discussion following Table 10.

Significant Variables

Metropolitan Readiness Tests. Since the Metropolitan Readiness Tests (MRT) total score indicated a significant correlation with the Stanford Reading Test score, Hypothesis A-1 would not be retained. The Metropolitan Readiness Tests given to Crane Elementary School pupils had a correlation of .59 with the Stanford Reading Test, Primary Level 1, Form A. The correlation of .59 was significant at the .01 level. The Metropolitan Readiness Tests have been well established as a predictor of first grade reading achievement and the correlation in this study would add support to previous research of Book (1974), Hess and Hahn (1974), Lewis (1974), and others. Bolig and Fletcher (1973) reported

Table 11. t Statistics of Independent and Dependent Variables (N = 187)

Independent Variables	Dependent Variable Stanford Reading Test
MRT total score	9.43*
Sex	3.12*
Chronological age	1.15
Primary language	5.47*
Family composition	1.58
Ordinal rank	0.03
Socio-economic status	5.35*

*Significant at .01 level.

that their data indicated that the Metropolitan Readiness Tests scores were more highly related with first grade success than were the ratings of kindergarten teachers.

Wallbrown, Wallbrown, and Engin (1974) stated that the Metropolitan Readiness Tests might be a better predictor of reading success when a visual approach to reading is used. However, in this study, the Lippincott program, which is a type of basal reader emphasizing intensive synthetic phonics with many auditory exercises, was used. This suggests that the Metropolitan Readiness Tests may be a good predictor of first grade reading success even in a program that does not stress merely a visual approach but includes many auditory activities.

Sex of the Child. Hypothesis A-2 would not be retained, for in this study the sex of the child correlated significantly with the Stanford Reading Test score. The correlation between sex of the child and the Stanford Reading Test score was .23 which was significant at the .01 level.

Of the 187 children included in this study, 95 were boys and 92 were girls. Table 12 indicates the mean score of the Stanford Reading Test was 109.5 for all the children in this study. The mean score for girls was 114.4 and for boys it was 104.8. The standard deviation for the total group was the same as for the girls, 21.2. For the boys the standard deviation was slightly less, 20.2.

The mean score for the girls was higher than the mean score for the boys. Although it was not the purpose of this study to determine the significance of the difference of the means, the fact that the girls had a higher mean score tends to lend support to Kolczynski's (1973) statement that as a group, girls show higher achievement in reading than boys. Kolczynski (1973, p. 2) also reported that it "hardly seems possible to separate the nature-nurture variable contributing to sex differences." Preston's (in Kolczynski 1973) study also showed that American girls excelled in reading over American boys while the opposite was true with the German students in his study. Dwyer's (1973) major explanation of sex differences centered on cultural pressures and sex-role expectations that are reinforced by

Table 12. Means and Standard Deviations of Stanford Reading Test Scores by Sex

Sex	Mean	Standard Deviation
Male	104.8	20.2
Female	114.4	21.2
Total	109.5	21.2

parents, teachers and society in general. Maccoby (1972) stated that recent research continues to find female superiority in a range of verbal tasks. The study by Anderson, Hughes, and Dixon (1956) pointed out that girls tended to learn to read earlier than boys and this study was concerned with beginning reading. Explanations for the relationship of sex and learning to read include a great divergence of opinion.

Primary Language. In this study the null Hypothesis A-4 would not be retained because the correlation between primary language and the Stanford Reading Test score was shown to be .38 which was significant at the .01 level.

A quote in Chapter 2 by Hansen (1974, p. 276) stated that, "Since language is the major medium of instruction, verbal differences may create a serious barrier to all forms of educational achievement." This study would tend to support Hansen's observation in that the language of instruction would be a

barrier to educational achievement for children whose primary language was not English. Actually these children face a double task. Not only do they have the task of learning to read, they must also learn the language in which they are being instructed for the greater part of the day. (Several of the first grade teachers in this study could use some Spanish for directions, but none would be considered truly bilingual.) Garcia (1974, p. 468) reported that "only 5.5% of the Chicano students receive some form of English as a second language instruction," so the children in this study would fit in with the majority who receive no English as a second language instruction. The only English as a second language instruction the non-English speaking students receive is that provided by their classroom teachers. There is no district-wide English as a second language program.

Of the 187 children in this study, 155, or 82.9%, were found to have English as their primary language. Based on results of the individually administered Shutt Primary Language Incator Test, 32, or 17.1%, were determined to have Spanish as their primary spoken language. The oral English ability of the children whose primary language was Spanish ranged from extremely limited English to some who were approaching proficiency in speaking either language. Even though the English-speaking group was so much larger than the Spanish-speaking group, the computer program used took into account the imbalance of sample size in computation.

Table 13 indicates the means and standard deviations of the Stanford Reading Test scores by primary language. The mean for the total group was 109.5 with 21.2 as the standard deviation. The mean score for children whose primary language was English was 113.0 with a standard deviation of 17.7. For children whose primary language was Spanish, the mean was 91.5 with a standard deviation of 27.8.

In addition, in this study most of the children whose primary language was Spanish, would be classified as being in the lower lower socio-economic group. As Shepherd (1974) stated, his results supported other research that disadvantaged children have smaller vocabularies and their language development is less than middle class white or black children.

Corcoran, Prescott, and Johnson (1974) stressed that children in the four to seven year range may not fully comprehend words designating spatial orientation. Morgan (1974) found that disadvantaged children were also unfamiliar with words such as "where" and "wishes" and frequently misinterpreted pictures unless they were extremely realistic. The findings of both these studies (age range and socio-economic status) may also be applicable to speculation concerning the children in this study and their Stanford Reading Test scores.

Foulke (1974) summed it up concisely when discussing skills needed for reading. She (1974, p. 312) stated, "A child

Table 13. Means and Standard Deviations of Stanford Reading Test Scores by Primary Language

Primary Language	Mean	Standard Deviation
Spanish	91.5	27.8
English	113.0	17.7
Total	109.5	21.2

needs to be at ease with the spoken language, which can be especially difficult for a child from a bilingual home."

Perhaps Andersson's (1974) suggestion provides a possible explanation. He (1974, p. 78) recommended the "extension of bilingual-bicultural education into the home, provided the families are receptive" to take advantage of the "prodigious learning potential of children between birth and age five."

Although the English-speaking females had the youngest mean age, 74.4 months (Table 14), they had the highest Stanford Reading Test score mean, 116.9 (Table 15). Next in mean age were the English-speaking boys at 75.3 months with a Stanford Reading Test score mean of 108.6. The mean age of Spanish-speaking females was 77.2 months and their mean Stanford Reading Test score was 92.2. The oldest group, the Spanish-speaking males with a mean age of 77.6 months, had the lowest Stanford Reading Test score mean of this study, 88.9.

Table 14. Means and Standard Deviations of Chronological Age of Students by Sex and Primary Language

Sex and Primary Language	Mean Age in Months	Standard Deviation
Male Spanish	77.6	3.4
Female Spanish	77.2	3.2
Male English	75.3	4.0
Female English	74.4	3.9
Total	75.4	4.4

Table 15. Means and Standard Deviations of Stanford Reading Test Scores by Sex and Primary Language

Sex and Primary Language	Mean	Standard Deviation
Male Spanish	88.9	25.4
Female Spanish	94.2	33.0
Male English	108.6	17.0
Female English	116.9	17.4
Total	109.5	21.2

Since three factors, sex, language, and chronological age were involved, it would be difficult to say which factor most influenced the total relationship. However, at this age, most Spanish-speaking children are not truly bilingual, and learning to read in English at the same time as learning the language poses a formidable task for both the pupil and the teacher.

Socio-Economic Status. The correlation between the child's socio-economic status and his Stanford Reading Test score was significant at the .01 level. Therefore, section A-7 of the null Hypothesis A could not be retained.

The pupils in this study were classified for socio-economic status according to the Warner Index (Warner and others 1960). Items used for classification were parents' occupations, sources of income, and dwelling areas. Approximately 44% of the pupils in this study could be considered upper middle or lower middle class, and 56% fit the classifications for upper lower and lower lower class (see Table 7, page 58). The males and females were distributed rather evenly in each socio-economic class (see Table 8, page 58). However, the majority of English-speaking children were in the middle classes, while all but one of the Spanish-speaking children were in the lower classes (see Table 9, page 59). This would appear to indicate that in this study at least, primary language was indeed related to socio-economic status. With its proximity to the Mexican border, there is an influx of immigrants to the area included in the Crane School

District. This is largely due to agricultural work opportunity with the resultant low paying jobs that would indicate lower socio-economic status.

The means and standard deviations of the Stanford Reading Test scores were computed for each socio-economic group and are shown in Table 16. The results tend to support findings of other research with the higher the socio-economic status, the higher the reading test scores. The means for each group in this study were as follows: upper middle, 121.1; lower middle, 116.3; upper lower, 108.5; and lower lower, 97.7. This study tended to support other reports that the higher socio-economic status pupils score better than the lower socio-economic status pupils. Hollingshead (1949, p. 330) stated that "the class to which a child belongs is a really significant factor in his relations with the school."

According to Swick (1973), children from the lower socio-economic levels generally have fewer listening opportunities, fewer visual opportunities, and deprivation of other sense processes, This deprivation can have a negative effect on general communicative development.

Non-Significant Variables

Chronological Age. On the basis of the results of this study, the null Hypothesis A-3 of no difference in scores according to chronological age would have to be retained. The correlation between the child's chronological age and the Stanford Reading Test score was not significant at the .05 level. In this

Table 16. Means and Standard Deviations of Stanford Reading Test Scores by Socio-Economic Status

Socio-Economic Status	Mean	Standard Deviation
Upper middle	121.1	11.4
Lower middle	116.3	17.7
Upper lower	108.5	19.6
Lower lower	97.7	23.7
Total	109.5	21.2

study the majority of the children were at the younger end of the age range which extended from 68 months to 87 months (see Table 2, page 53).

One might have speculated that the older age groups of children would score higher on the Stanford Reading Test. However, looking at mean scores by chronological age, Table 17, divided into three months units, the youngest group (68 months to 70 months at entrance) scored the highest with a mean of 115.6. The second youngest division (71 months to 73 months) was next with a mean of 110. This accounted for 36% of the children in the study. The group aged 77 to 79 months at entrance was very close behind with a mean score of 109, and the 80 to 82 months group had a mean of 108.9. The 74 to 76 months group dropped to a mean of 107 and the 83 to 85 months group had the lowest mean, 106.

Table 17. Means and Standard Deviations of Stanford Reading Test Scores by Chronological Age

Age in Months September 1, 1974	Mean	Standard Deviation
68 to 70	115.6	13.8
71 to 73	110.0	18.9
74 to 76	107.0	27.9
77 to 79	109.0	15.1
80 to 82	108.9	33.2
83 to 85	106.1	12.3
86 to 88	109.0	--
Total	109.5	21.2

While chronological age appeared to have a negative relationship with the Stanford Reading Test score, the correlation was not significant at the .05 level. Chronological age correlated significantly at the .01 level with primary language in this study. Part of the explanation for this may be due to placing into first grade several older Spanish-speaking pupils so they can learn the language and gain some proficiency before going on. In this study, both Spanish-speaking males and females were a few months older than the English-speaking children based on mean age in months (see Table 14, page 71).

In this study, it is possible that language, rather than age, was the factor that made chronological age appear to have a negative correlation with the Stanford Reading Test score. "Since language is the major medium of instruction, verbal differences may create a serious barrier to all forms of educational achievement (Hansen 1974, p. 276)."

Family Composition. The null Hypothesis A-5 of no relationship between reading scores and family composition would have to be retained on the basis of results of this study. The correlation between family composition and the Stanford Reading Test score was not significant at the .05 level.

Approximately 80% of the children in this study lived in a family consisting of a mother, a father, and more than one child. An additional 10% had a family situation of a mother, a father, and only one child. Since so few were from single-parent homes, there probably was inadequate representation for comparison purposes.

Santrock's (1972) study indicated that father-absent boys performed more poorly than father-present boys or father-absent girls. This study could not support his research. Atkinson and Ogston (1974) found no significant differences scholastically between father-absent males and father-present males ages eight to 16. Since statistics from the United States Census Bureau indicate that single-parent families are increasing, it might be interesting to determine if the 10% single-parent homes represented

in this study denote an increase over previous years in the Crane School District.

Table 18 depicts the means and standard deviations of Stanford Reading Test scores by family composition. The mean for children living with two parents was 110, while the mean for children from single-parent families was slightly lower with the exception of the one case of a child who lived only with the father.

Ordinal Rank. The null Hypothesis A-6 of no relationship between ordinal rank in the family and success in reading would have to be retained on the basis of this study. The correlation between ordinal rank and the Stanford Reading Test score was not significant at the .05 level.

Seventy-nine, or 42.2%, of the pupils in this study were first-born or only children, and an additional 24.6%, or 46, were second-born. Twenty-nine, or nearly 16%, were third-born and 21, or 11.2%, were fourth-born. Only 6.5% make up the rest of the range.

The mean of the Stanford Reading Test score was computed for each group of children depending on whether they were first-born, second-born, third-born, and so on. The means and standard deviations are shown in Table 19. Actually the highest mean, 116.8, was for the group of five children who were fifth-born in their families. Second-borns were next with a mean Stanford Reading Test score of 111.5. Nearly 25% of the children were

Table 18. Means and Standard Deviations of Stanford Reading Test Scores by Family Composition

Family Composition	Mean	Standard Deviation
Mother, father, one child	109.8	16.7
Mother, father, children	110.3	21.9
Mother and one child	109.5	26.4
Father and one child	117.0	--
Mother and children	101.6	18.6
Father and children	105.0	8.9
Other	81.0	--
Total	109.5	21.2

Table 19. Means and Standard Deviations of Stanford Reading Test Scores by Birth Order

Birth Order	Mean	Standard Deviation
First born (or only)	109.5	25.1
Second born	111.5	14.8
Third born	110.2	17.0
Fourth born	108.2	12.9
Fifth Born	116.8	18.0
Sixth born	111.0	11.5
Eighth born	101.5	15.5
Total	109.5	21.2

second-born. Children who were sixth-born in the family had a mean score of 111.0. The mean score for third-borns was 110.2. The first-borns, who have been shown in other studies to score the highest, actually were fifth ranked according to mean scores of the group. This group included both first-borns and only children and comprised 42% of the total number of children in this study.

At this stage in the children's lives, first grade beginning reading, the child's birth order in his family appeared to have no relationship to his achievement in reading. Adlerians hold the view that the first-born child tends to direct his behavior toward being first or best (Hillman 1972). This study could not lend support to that view. Kahn (1974) considered first-born girls or only children most likely to achieve academically. Glass, Neulinger, and Brim (1974) concluded that the idea of first-born or only children having higher educational aspirations than later born was true only for families of higher socio-economic background.

Intercorrelations

An examination of the intercorrelations between the independent variables indicates the extent of the interrelationship of the independent variables. Table 20 presents the intercorrelations of the independent variables.

The Metropolitan Readiness Tests total score indicated a significant intercorrelations at the .05 level with the child's

Table 20. Intercorrelations of Independent Variables (N = 187)

Variables	Sex	Chronological Age	Primary Language	Family Composition	Ordinal Rank	Socio-Economic Status
MRT total score	.17*	.04	.40*	.10	.05	.49**
Sex		.08	.10	.04	.13	.05
Chronological age			.29**	.01	.02	.14
Primary language				.06	.15*	.46**
Family composition					.07	.14
Ordinal rank						.07

*Significant at .05 level.

**Significant at .01 level.

sex. The Metropolitan Readiness Tests total score was also positively intercorrelated with the child's primary language and socio-economic status at the .01 level of significance. The Metropolitan Readiness Tests total score did not significantly intercorrelate with chronological age, family composition, or ordinal rank in this study.

The child's sex indicated no significant intercorrelation with any independent variable other than the Metropolitan Readiness Tests total score.

The chronological age of the child indicated a significant intercorrelation with his primary language but with no other variable.

Primary spoken language of the child was significantly intercorrelated at the .01 level with socio-economic status, Metropolitan Readiness Tests total score, and chronological age. At the .05 level, language indicated a positive intercorrelation with ordinal rank. There was no significant intercorrelation between language and sex or language and family composition.

Family composition, or the makeup of the family of the child, indicated no significant intercorrelation whatever with any other variable at the .05 level.

Ordinal rank was significantly intercorrelated only with primary language at the .05 level. It indicated no significant intercorrelation with any other independent variable.

Socio-economic status revealed a significant intercorrelation with primary language and the Metropolitan Readiness Tests total score at the .01 level. Socio-economic status was not significantly intercorrelated with the child's sex, chronological age, family composition, or ordinal rank. While family composition might have been related to socio-economic status in other studies, it was not in this one.

Table 21 presents the t statistics of the intercorrelations of the independent variables. One can readily see which results exceeded ± 1.96 for the .05 level of significance and which exceeded ± 2.58 to indicate the .01 level of significance.

Analysis of Hypothesis B

Hypothesis B was stated as: No combination of factors has a significantly higher relationship to reading achievement in first grade than any single factor. Hypothesis B would not be retained on the basis of this study as there were certain combinations that had a higher relationship to reading achievement in first grade than some of the single factors.

Seven independent variables were correlated and regression analysis calculated against the dependent variable, the Stanford Reading Test score. The seven independent variables were: Metropolitan Readiness Tests total score, child's sex, chronological age, primary language, family composition, ordinal rank, and socio-economic status. Of the seven, four correlated

Table 21. t Statistics of Independent Variables

Variables	Sex	Chrono-logical Age	Primary Language	Family Composi-tion	Ordinal Rank	Socio-Economic Status
MRT total score	2.25*	0.52	5.66**	1.35	0.61	7.20**
Sex		1.04	1.31	0.50	1.83	0.67
Chronological age			4.17**	0.13	0.22	1.95
Primary language				0.86	2.10*	7.01**
Family composition					0.99	1.89
Ordinal rank						0.97
Socio-economic status						

*Significant at .05 level.

**Significant at .01 level.

significantly with the Stanford Reading Test score. Those four were: Metropolitan Readiness Tests total score, the child's sex, primary language, and socio-economic status. Chronological age, family composition, and ordinal rank did not correlate significantly with the Stanford Reading Test score at the .05 level.

Table 22 presents the correlation of the significant variables with the Stanford Reading Test score. Also given are the means and standard deviations of each of the four significant variables.

The number of different combinations possible of the seven variables totaled 120. There were 21 two-variable combinations, 35 three-variables combinations, 35 four-variable combinations, 21 five-variable combinations, seven six-variable combinations, and one seven-variable combination. Of the 120 combinations, 116 of them were statistically significant at the .01 level when correlated with the Stanford Reading Test score. If the combination contained even one significant variable, the multiple correlation coefficient of that combination was statistically significant at the .01 level.

The following six tables (Tables 23 to 28) list the multiple correlation coefficients for the various combinations. The variables were numbered to correspond with their placement as stated in the first hypothesis. The correlations were ranked from highest to lowest and were given to four decimal places to indicate the differences. Rounding the correlations to two

Table 22. Correlations of Significant Variables with Stanford Reading Test Score (N = 187)

Significant Variable	Correlation	Mean	Standard Deviation
1. MRT total score	.59	56.98	16.62
2. Sex	.23	1.50	.50
4. Primary language	.38	1.83	.38
7. Socio-economic status	.37	3.79	.90

decimal places would not show the slight differences. The asterisk beside the variable indicates the significant contribution of that variable to the combination.

Table 23 lists the multiple correlation coefficients of the 21 two-variable combinations with the Stanford Reading Test score. The highest correlation of a two-variable combination was .6277 for the Metropolitan Readiness Tests total score and ordinal rank, however, the Metropolitan Readiness Tests total score made the significant contribution to the combination. In the second highest correlation of two-variable combinations, both the Metropolitan Readiness Tests total score and the child's sex contributed significantly at the .05 level. The child's sex was the only variable to make a significant contribution to a combination when the Metropolitan Readiness Tests total score was the other variable. As long as the Metropolitan Readiness Tests total

Table 23. Multiple Correlation Coefficients of Two-Variable Combinations with Stanford Reading Test Score

Multiple Correlation Coefficient		Combinations of Variables
.6277	1**6	MRT total score**, Ordinal Rank
.6117	1**2*	MRT total score**, Sex*
.6065	1**4	MRT total score**, Language
.6012	1**3	MRT total score**, Chronological Age
.6000	1**5	MRT total score**, Family Composition
.5996	1**7	MRT total score**, Socio-Economic Status
.4423	4**7**	Language**, Socio-Economic Status**
.4210	2**7**	Sex**, Socio-Economic Status**
.4200	2**4**	Sex**, Language**
.4017	4**5*	Language**, Family Composition*
.3812	5 7**	Family Compositon, Socio-Economic Status**
.3772	3 4**	Chronological Age, Language**
.3722	3 7**	Chronological Age, Socio-Economic Status**
.3620	6 7**	Ordinal Rank, Socio-Economic Status**
.3475	4**6	Language**, Ordinal Rank
.2782	2**6	Sex**, Ordinal Rank
.2509	2**5	Sex**, Family Composition
.2321	2**3	Sex**, Chronological Age
.1432	3 5	Chronological Age, Family Composition
.1328	5 6	Family Composition, Ordinal Rank
.0564	3 6	Chronological Age, Ordinal Rank

*Significant at .05 level. **Significant at .01 level.

was one variable of the two-variable combinations, the multiple correlations ranged within .0281 of each other. When the Metropolitan Readiness Tests total score was dropped, the multiple correlation coefficient also dropped, but was still significant at the .01 level. It was surprising to note that family composition made a significant contribution to the combination when paired with language but not individually or with any other variable. Without the Metropolitan Readiness Tests total score, the highest two-variable correlation was .4423 for language and socioeconomic status with both variables contributing significantly to the multiple correlation coefficient. Of the 21 two-variable combinations, only the last three did not show a significant correlation with the Stanford Reading Test score. Those combinations were made up of the three variables that individually were also not significantly correlated with the Stanford Reading Test score.

Following is Table 24 which presents the 35 three-variable combinations and the multiple correlation coefficients of each combination with the Stanford Reading Test score. The highest multiple correlation coefficient was .6588 which was for the combination of Metropolitan Readiness Tests total score, sex, and ordinal rank. Both Metropolitan Readiness Tests total score and the child's sex contributed significantly to the correlation coefficient but ordinal rank did not. As in the two-variable combinations, as long as the Metropolitan Readiness Tests total

Table 24. Multiple Correlation Coefficients of Three-Variable Combinations with Stanford Reading Test Score

Multiple Correlation Coefficient		Combinations of Variables
.6588	1**2**6	MRT total score**, Sex**, Ordinal Rank
.6356	1**5 6	MRT total score**, Family Composition, Ordinal Rank
.6309	1**3 6	MRT total score**, Chronological Age, Ordinal Rank
.6306	1**6 7	MRT total score**, Ordinal Rank, Socio-Economic Status
.6301	1**4 6	MRT total score**, Language, Ordinal Rank
.6216	1**2* 4	MRT total score**, Sex*, Language
.6169	1**2* 5	MRT total score**, Sex*, Family Composition
.6164	1**2* 7	MRT total score**, Sex*, Socio-Economic Status
.6152	1**2* 3	MRT total score**, Sex*, Chronological Age
.6126	1**4* 5	MRT total score**, Language*, Family Composition
.6080	1**3 4	MRT total score**, Chronological Age, Language
.6079	1**4 7	MRT total score**, Language, Socio-Economic Status
.6067	1**3 5	MRT total score**, Chronological Age, Family Composition
.6067	1**5 7	MRT total score**, Family Composition, Sccio-Economic Status
.6050	1**3 7	MRT total score**, Chronological Age, Socio-Economic Status
.4775	2**4**7**	Sex**, Language**, Socio-Economic Status**

Table 24, Continued

Multiple Correlation Coefficient		Combinations of Variables
.4591	4**5 7**	Language**, Family Composition, Socio-Economic Status**
.4427	3 4**7**	Chronological Age, Language**, Socio-Economic Status**
.4402	2**4**5*	Sex**, Language**, Family Composition*
.4382	2**6 7**	Sex**, Ordinal Rank, Socio-Economic Status**
.4289	2**5 7**	Sex**, Family Composition, Socio-Economic Status**
.4219	2**3 4**	Sex**, Chronological Age, Language**
.4210	2**3 7**	Sex**, Chronological Age, Socio-Economic Status**
.4203	4**6 7**	Language**, Ordinal Rank, Socio-Economic Status**
.4165	2**4**6	Sex**, Language**, Ordinal Rank
.4023	3 4**5*	Chronological Age, Language**, Family Composition*
.3830	3 5 7**	Chronological Age, Family Composition, Socio-Economic Status**
.3816	4**5* 6	Language**, Family Composition*, Ordinal Rank
.3786	5 6 7**	Family Composition, Ordinal Rank, Socio-Economic Status**
.3620	3 6 7**	Chronological Age, Ordinal Rank, Socio-Economic Status**
.3494	3 4**6	Chronological Age, Language**, Ordinal Rank
.3033	2**5 6	Sex**, Family Composition, Ordinal Rank

Table 24, Continued

Multiple Correlation Coefficient		Combinations of Variables
.2786	2**3 6	Sex**, Chronological Age, Ordinal Rank
.2560	2**3 5	Sex**, Chronological Age, Family Composition
.1434	3 5 6	Chronological Age, Family Composition, Ordinal Rank

*Significant at .05 level.

**Significant at .01 level.

score was one of the variables, the multiple correlation coefficient varied only slightly. Without using the Metropolitan Readiness Tests total score, the highest multiple correlation coefficient for a three-variable combination was .4775 for sex, primary language, and socio-economic status with all three variables contributing significantly to the multiple correlation coefficient. Of the variables that made significant contributions to the multiple correlation coefficients of the combinations, all but one were also significantly correlated individually with the Stanford Reading Test score. Family composition made a significant contribution at the .05 level when in combination with sex and primary language, primary language and chronological age, and primary language and ordinal rank, but not in other combinations. Only one three-variable combination was not significantly correlated with the Stanford Reading Test score. That was the combination of the three individually non-significant variables: chronological age, family composition, and ordinal rank.

Table 25 records the multiple correlation coefficients of the 35 four-variable combinations with the Stanford Reading Test score. The highest multiple correlation coefficient was .6652 for the combination of Metropolitan Readiness Tests total score, child's sex, family composition, and ordinal rank. Only the Metropolitan Readiness Tests total score and the child's sex made a significant contribution to the correlation coefficient of that combination. When the Metropolitan Readiness Tests total score

Table 25. Multiple Correlation Coefficients of Four-Variable Combinations with Stanford Reading Test Score

Multiple Correlation Coefficient		Combinations of Variables
.6652	1**2**5 6	MRT total score**, Sex**, Family Composition, Ordinal Rank
.6601	1**2**6 7	MRT total score**, Sex**, Ordinal Rank, Socio-Economic Status
.6596	1**2**4 6	MRT total score**, Sex**, Language, Ordinal Rank
.6592	1**2**3 6	MRT total score**, Sex**, Chronological Age, Ordinal Rank
.6408	1**5 6 7	MRT total score**, Family Composition, Ordinal Rank, Socio-Economic Status
.6387	1**4 5 6	MRT total score**, Language, Family Composition, Ordinal Rank
.6383	1**3 5 6	MRT total score**, Chronological Age, Family Composition, Ordinal Rank
.6328	1**3 6 7	MRT total score**, Chronological Age, Ordinal Rank, Socio-Economic Status
.6319	1**4 6 7	MRT total score**, Language, Ordinal Rank, Socio-Economic Status
.6318	1**3 4 6	MRT total score**, Chronological Age, Language, Ordinal Rank
.6278	1**2**4 5	MRT total score**, Sex**, Language, Family Composition
.6236	1**2* 4 7	MRT total score**, Sex*, Language, Socio-Economic Status
.6223	1**2* 5 7	MRT total score**, Sex*, Family Composition, Socio-Economic Status
.6222	1**2* 3 4	MRT total score**, Sex*, Chronological Age, Language

Table 25, Continued

Multiple Correlation Coefficient		Combinations of Variables
.6201	1**2* 3 5	MRT total score**, Sex*, Chronological Age, Family Composition
.6189	1**2* 3 7	MRT total score**, Sex*, Chronological Age, Socio-Economic Status
.6169	1**4 5 7	MRT total score**, Language, Family Composition, Socio-Economic Status
.6145	1**3 4 5	MRT total score**, Chronological Age, Language, Family Composition
.6116	1**3 5 7	MRT total score**, Chronological Age, Family Composition, Socio-Economic Status
.6102	1**3 4 7	MRT total score**, Chronological Age, Language, Socio-Economic Status
.4908	2**4**5 7**	Sex**, Language**, Family Composition, Socio-Economic Status**
.4792	2**3 4**7**	Sex**, Chronological Age, Language**, Socio-Economic Status**
.4762	2**4**6 7**	Sex**, Language**, Ordinal Rank, Socio-Economic Status**
.4598	3 4**5 7**	Chronological Age, Language**, Family Composition, Socio-Economic Status**
.4490	2**5 6 7**	Sex**, Family Composition, Ordinal Rank, Socio-Economic Status**
.4439	4**5* 6 7**	Language**, Family Composition*, Ordinal Rank, Socio-Economic Status**
.4423	2**3 4**5*	Sex**, Chronological Age, Language**, Family Composition*
.4411	2**4**5* 6	Sex**, Language**, Family Composition*, Ordinal Rank

Table 25, Continued

Multiple Correlation Coefficient	Combinations of Variables
.4394	2**3 6 7** Sex**, Chronological Age, Ordinal Rank, Socio-Economic Status**
.4289	2**3 5 7** Sex**, Chronological Age, Family Composition, Socio-Economic Status**
.4225	3 4**6 7** Chronological Age, Language**, Ordinal Rank, Socio-Economic Status**
.4214	2**3 4**6 Sex**, Chronological Age, Language**, Ordinal Rank
.3840	3 4**5* 6 Chronological Age, Language**, Family Composition*, Ordinal Rank
.3786	3 5 6 7** Chronological Age, Family Composition, Ordinal Rank, Socio-Economic Status**
.3036	2**3 5 6 Sex**, Chronological Age, Family Composition, Ordinal Rank

*Significant at .05 level,

**Significant at .01 level.

was dropped from the combination, the multiple correlation coefficient also dropped from the .60's to .49 or lower. However, all of the four-variable combinations were significant correlated at the .01 level with the Stanford Reading Test score. All of the combinations contained at least one variable that had also been significant individually with the Stanford Reading Test score, and in general that was the variable that contributed significantly to the combination's correlation coefficient. The only exception was that family composition, which was not individually significantly correlated with the Stanford Reading Test score, did contribute significantly at the .05 level in four of the combinations.

In Table 26, the multiple correlation coefficients of the five-variable combinations with the Stanford Reading Test score are arranged from highest to lowest with all of the correlations being significant at the .01 level. The highest correlation was .6681 and contained the variables, Metropolitan Readiness Tests total score, child's sex, family composition, ordinal rank, and socio-economic status. Only the Metropolitan Readiness Tests total score and the child's sex contributed significantly to the multiple correlation coefficient of that combination. In fact, in all the combinations that contained the Metropolitan Readiness Tests total score and sex, those variables were the ones that made the significant contributions to the multiple correlation coefficient. In combinations that did not contain the

Table 26. Multiple Correlation Coefficients of Five-Variable Combinations with Stanford Reading Test Score

Multiple Correlation Coefficient		Combinations of Variables
.6681	1**2**5 6 7	MRT total score**, Sex**, Family Composition, Ordinal Rank, Socio-Economic Status
.6664	1**2**4 5 6	MRT total score**, Sex**, Language, Family Composition, Ordinal Rank
.6655	1**2**3 5 6	MRT total score**, Sex**, Chronological Age, Family Composition, Ordinal Rank
.6605	1**2**4 6 7	MRT total score**, Sex**, Language, Ordinal Rank, Socio-Economic Status
.6603	1**2**3 6 7	MRT total score**, Sex**, Chronological Age, Ordinal Rank, Socio-Economic Status
.6597	1**2**3 4 6	MRT total score**, Sex**, Chronological Age, Language, Ordinal Rank
.6432	1**4 5 6 7	MRT total score**, Language, Family Composition, Ordinal Rank, Socio-Economic Status
.6426	1**3 5 6 7	MRT total score**, Chronological Age, Family Composition, Ordinal Rank, Socio-Economic Status
.6399	1**3 4 5 6	MRT total score**, Chronological Age, Language, Family Composition, Ordinal Rank
.6334	1**3 4 6 7	MRT total score**, Chronological Age, Language, Ordinal Rank, Socio-Economic Status
.6312	1**2* 4 5 7	MRT total score**, Sex*, Language, Family Composition, Socio-Economic Status
.6282	1**2* 3 4 5	MRT total score**, Sex*, Chronological Age, Language, Family Composition

Table 26, Continued

Multiple Correlation Coefficient		Combinations of Variables
.6246	1**2* 3 5 7	MRT total score**, Sex*, Chronological Age, Family Composition, Socio-Economic Status
.6243	1**2* 3 4 7	MRT total score**, Sex*, Chronological Age, Language, Socio-Economic Status
.6186	1**3 4 5 7	MRT total score**, Chronological Age, Language, Family Composition, Socio-Economic Status
.4928	2**3 4**5 7**	Sex**, Chronological Age, Language**, Family Composition, Socio-Economic Status**
.4928	2**4**5 6 7**	Sex**, Language**, Family Composition, Ordinal Rank, Socio-Economic Status**
.4808	2**3 4**6 7**	Sex**, Chronological Age, Language**, Ordinal Rank, Socio-Economic Status**
.4502	2**3 5 6 7**	Sex**, Chronological Age, Family Composition, Ordinal Rank, Socio-Economic Status**
.4465	3 4**5* 6 7**	Chronological Age, Language**, Family Composition*, Ordinal Rank, Socio-Economic Status**
.4464	2**3 4**5* 6	Sex**, Chronological Age, Language**, Family Composition*, Ordinal Rank

*Significant at .05 level.

**Significant at .01 level.

Metropolitan Readiness Tests total score, sex, primary language, and socio-economic status made significant contributions to the multiple correlation coefficient.

Table 27 presents the six-variable combinations and their multiple correlation coefficients with the Stanford Reading Test score. The highest correlation coefficient was .6692 for the combination of Metropolitan Readiness Tests total score, the child's sex, primary language, family composition, ordinal rank, and socio-economic status. Only the Metropolitan Readiness Tests total score and the child's sex contributed significantly to the correlation. All seven of the six-variable combinations were significantly correlated at the .01 level with the Stanford Reading Test score. The lowest six-variable combination did not contain the Metropolitan Readiness Tests total score, but the multiple correlation coefficient was still significant at the .01 level.

The multiple correlation coefficient for the combination of all seven variables was .6692 which was the same as for the six-variable combination excluding chronological age. The multiple correlation coefficient of .6692 was significantly correlated at the .01 level with the Stanford Reading Test score. Table 28 lists the rank order of the seven variables with regard to their contribution to the multiple correlation coefficient showing the t statistic, coefficient of multiple determination and multiple correlation. The greatest contribution appeared to be made by

Table 27. Multiple Correlation Coefficients of Six-Variable Combinations with Stanford Reading Test Score

Multiple Correlation Coefficient		Combinations of Variables
.6692	1**2**4 5 6 7	MRT total score**, Sex**, Language, Family Composition, Ordinal Rank, Socio-Economic Status
.6683	1**2**3 5 6 7	MRT total score**, Sex**, Chronological Age, Family Composition, Ordinal Rank, Socio-Economic Status
.6665	1**2**3 4 5 6	MRT total score**, Sex**, Chronological Age, Language, Family Composition, Ordinal Rank
.6606	1**2**3 4 6 7	MRT total score**, Sex**, Chronological Age, Language, Ordinal Rank, Socio-Economic Status
.6441	1**3 4 5 6 7	MRT total score**, Chronological Age, Language, Family Composition, Ordinal Rank, Socio-Economic Status
.6316	1**2* 3 4 5 7	MRT total score**, Sex*, Chronological Age, Language, Family Composition, Socio-Economic Status
.4980	2**3 4**5 6 7**	Sex**, Chronological Age, Language**, Family Composition, Ordinal Rank, Socio-Economic Status**

*Significant at .05 level.

**Significant at .01 level.

Table 28. Rank Order of Variables with Regard to Contribution to the Multiple Correlation Showing t Statistic, Coefficient of Multiple Determination, and Multiple Correlation

Variable	t Statistic*	R^2	R
MRT total score	7.332	.3931	.627
Sex	3.022	.0847	.291
Family composition	1.779	.0392	.198
Primary language	0.576	.1030	.321
Socio-economic status	0.491	.1340	.366
Ordinal rank	0.071	.0001	.011
Chronological age	0.053	.0010	.032

*t Level was set at 1.96 (significant at the .05 level).

the Metropolitan Readiness Tests total score with a coefficient of determination of approximately .39. Next would be socio-economic status with a coefficient of determination of .13. The coefficient of determination was .10 for primary language and .08 for the child's sex. Family composition with a coefficient of determination of .04, chronological age with .001, and ordinal rank with .0001 were the lowest of the seven variables tested.

No attempt was made to measure the intelligence of the first graders involved in the study, but it was assumed there

was a normal distribution of intelligence with the group. Intelligence could be considered an unmeasured contributing factor.

As a summary, Table 29, lists the highest multiple correlation coefficient of each combination group, although these are not the seven highest correlations overall. It is interesting to note that the multiple correlation coefficient is the same for both the six-variable and seven-variable group. Dropping or adding chronological age did not change the multiple correlation coefficient for the group. The highest five-variable combination consisted of Metropolitan Readiness Tests total score, child's sex, family composition, ordinal rank, and socio-economic status. The highest four-variables combination contained Metropolitan Readiness Tests total score, child's sex, family composition, and ordinal rank. The Metropolitan Readiness Tests total score, child's sex, and ordinal rank made up the highest three-variable combination, and for the highest two-variable combination, the Metropolitan Readiness Tests total score and ordinal rank were the components. The Metropolitan Readiness Tests total score had the highest individual variable correlation coefficient with the Stanford Reading Test score.

Table 29. Highest Multiple Correlation Coefficient of Each Combination Group

Multiple Correlation Coefficient	Combinations of Variables	
.6692	1**2**3 4 5 6 7	MRT total score, Sex, Chronological Age, Language, Family Composition, Ordinal Rank, Socio-Economic Status
.6692	1**2**4 5 6 7	MRT total score, Sex, Language, Family Composition, Ordinal Rank, Socio-Economic Status
.6681	1**2**5 6 7	MRT total score, Sex, Family Composition, Ordinal Rank, Socio-Economic Status
.6652	1**2**5 6	MRT total score, Sex, Family Composition, Ordinal Rank
.6588	1**2**6	MRT total score, Sex, Ordinal Rank
.6277	1**6	MRT total score, Ordinal Rank
.5940	1**	MRT total score

**Significant at .01 level.

Summary

Of the seven variables considered in this study, four were significantly correlated with the Stanford Reading Test score at the .05 level. The four significant variables were: Metropolitan Readiness Tests total score, child's sex, primary language, and socio-economic status. The three variables that were not significantly correlated at the .05 level with the Stanford Reading Test score were chronological age, family composition, and ordinal rank.

There were 120 possible combinations of the seven variables and the multiple correlation coefficients of all of the combinations were tested for significance against the Stanford Reading Test score. If the combinations contained even one significant variable (Metropolitan Readiness Tests total score, child's sex, primary language, or socio-economic status), the multiple correlation coefficient of that combination was significant at the .01 level. One hundred sixteen of the 120 combinations indicated a significant correlation with the Stanford Reading Test score at the .05 level or better.

CHAPTER 4

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purposes of this chapter are to summarize the findings of this study, to draw conclusions based on those findings, and to make recommendations pertinent to the problem of determining the relationship of factors that may contribute to success in first grade reading.

Summary

This study was conducted to measure the relationship of a number of factors that may contribute to predictability of success in first grade beginning reading as measured by the Stanford Reading Test. The researcher attempted to demonstrate which of seven factors (Metropolitan Readiness Tests total score, sex, chronological age, primary language, family composition, ordinal rank, and socio-economic status) or combination of factors was most highly related to reading success in first grade.

The hypotheses tested were:

A. There is no significant relationship between reading achievement in first grade and each of the following listed factors:
   1. Metropolitan Readiness Tests total score
   2. Sex of the child

3. Chronological age of the child
4. Primary language spoken
5. Composition of family
6. Child's ordinal rank in family
7. Socio-economic status of child's family

B. No combination of factors has a significantly higher relationship to reading achievement in first grade than any single factor.

The subjects of this study included all of the children enrolled in the first grade at Crane Elementary School District as of March 1, 1975, who had had at least six months of reading instruction in the district but who were not repeating first grade. Of the 260 children enrolled in the first grades as of March 1, 1975, 187 met the requirements (six months reading instruction in the Crane School District and were not repeating first grade) and were included in the scope of this study. All nine first grade teachers of the two elementary schools of the Crane School District participated in the study. All of them used the Lippincott Basic Reading series which can be described as being a type of basal reader utilizing intensive synthetic phonics for reading instruction.

Tests utilized for this study included the Reading Test of the Stanford Achievement Test, Level 1, Form A, which was administered March 4 and 5, 1975, to all first grade children by their classroom teachers. This test was the dependent variable.

The Shutt Primary Language Indicator Test was used to determine the child's primary language, Spanish or English. The Shutt Primary Language Indicator Test was administered individually to children whose permanent records indicated that another language, in addition to English, was spoken in the home.

The Warner Index was used as a guide for determining the socio-economic status of the child's family. While the Warner Index is not a test, per se, the guidelines were used to classify the child's family into levels such as lower lower, upper lower, lower middle, upper middle, etc.

The child's Metropolitan Readiness Tests total score was obtained from school records. The children were given the tests by their kindergarten teachers at the end of their kindergarten year, May, 1974.

All data were collected from school records, direct parent contact, and testing. The information was organized and treated as group data once the study was in progress.

Each of the independent variables (Metropolitan Readiness Tests total score, child's sex, chronological age, primary language, family composition, ordinal rank, socio-economic status) was correlated individually and collectively with the dependent variable which was the Reading Test of the Stanford Achievement Test, Primary Level 1, Form A. The raw data were analyzed on an IBM 1130 Computer System utilizing the Scientific Sub-Routine Package as developed by IBM. The means, variances and standard

deviations of all independent and dependent variables were computed. Multiple linear regression analysis was performed for the set of independent and dependent variables. In addition, the Scientific Sub-Routine Package computed t values for each of the multiple correlations. All t tests were subjected to analysis at the .05 level of significance. F tests were performed on each variable and combination of variables to determine the strength of the relationship.

Four of the seven independent variables were significantly correlated with the Stanford Reading Test score. The Metropolitan Readiness Tests total score, sex of the child, primary spoken language, and socio-economic status were significantly correlated with the Stanford Reading Test score at the .01 level. Therefore, Hypothesis A (No significant relationship between reading achievement in first grade and each of the seven independent variables listed above) was not retained. Sections A-1 (Metropolitan Readiness Tests total score), A-2 (sex), A-4 (language), and A-7 (socio-economic status) were found to have a significant correlation with the dependent variable, the Stanford Reading Test score. Sections A-3 (chronological age), A-5 (family composition), and A-6 (ordinal rank) would be retained since no significant correlation with the dependent variable was found.

In addition the Metropolitan Readiness Tests total score indicated significant positive intercorrelations with the child's primary language and socio-economic status at the .01 level, and

with the child's sex at the .05 level. Primary spoken language of the child was significantly intercorrelated at the .01 level with socio-economic status, Metropolitan Readiness Tests total score, and chronological age. At the .05 level, language indicated a positive intercorrelation with ordinal rank. No other significant intercorrelations were found.

There were 120 possible combinations of the seven variables, and the multiple correlation coefficients of all the combinations were tested for significance with the Stanford Reading Test score. One hundred sixteen of the 120 combinations indicated a significant correlation with the Stanford Reading Test score at the .05 level or better. Therefore, Hypothesis B (No combination of factors has a significantly higher relationship to reading achievement in first grade than any single factor) was not retained.

Conclusions

On the basis of the data presented in this investigation, the following generalized conclusions were reached:

1. The Metropolitan Readiness Tests total score was a good single predictor for success in first grade reading even when an intensive synthetic phonics method of teaching reading was used.
2. Sex was shown to be significantly related to reading achievement.

3. Chronological age did not appear to be related to reading achievement.
4. Primary language appeared to have a significant relationship to reading achievement.
5. Family composition was not shown to be significantly related to reading achievement.
6. The child's ordinal rank in the family did not appear to be significantly related to reading achievement.
7. The socio-economic status of the child's family was significantly related to reading achievement.
8. If the combinations of variables contained even one significant variable (Metropolitan Readiness Tests total score, child's sex, primary language, or socio-economic status), the multiple correlation coefficient of that combination indicated significance at the .01 level with the Stanford Reading Test score.

Recommendations

As a result of the analysis of the data, the following recommendations are suggested:

1. The use of the Metropolitan Readiness Tests should be given strong consideration for determining readiness for reading. Following the administration, the results should be developed into profiles for interpretation. Low profile students should be given specific developmental instruction based on profile interpretation.

2. Boys, especially, should be carefully diagnosed and evaluated for whatever reading skills help they may need as soon as possible.
3. Children whose primary language is other than English should be given prior and concurrent vocabulary development instruction along with reading instruction.
4. Children from lower socio-economic groups should be given opportunity to expand and develop their vocabulary by providing many experiences both in and out of the classroom.
5. Persons skilled in developmental reading should aid teachers in adapting the program to fit the children's individual need taking into consideration all of the above factors and any others that may affect the child's progress in reading.
6. Arrangements should be made for personnel and materials to develop areas in which a child is lacking to provide opportunity for maximum results.

Recommendations for further study include:

1. Replicate this study in areas using different methods of reading instruction to determine if different results are obtained.
2. A follow-up of this study should be done in successive years up through the sixth grade to determine if any relationships change.

APPENDIX A

PHONEME-GRAPHEME SEQUENCE FOR BOOKS A, B, C, D

Book A

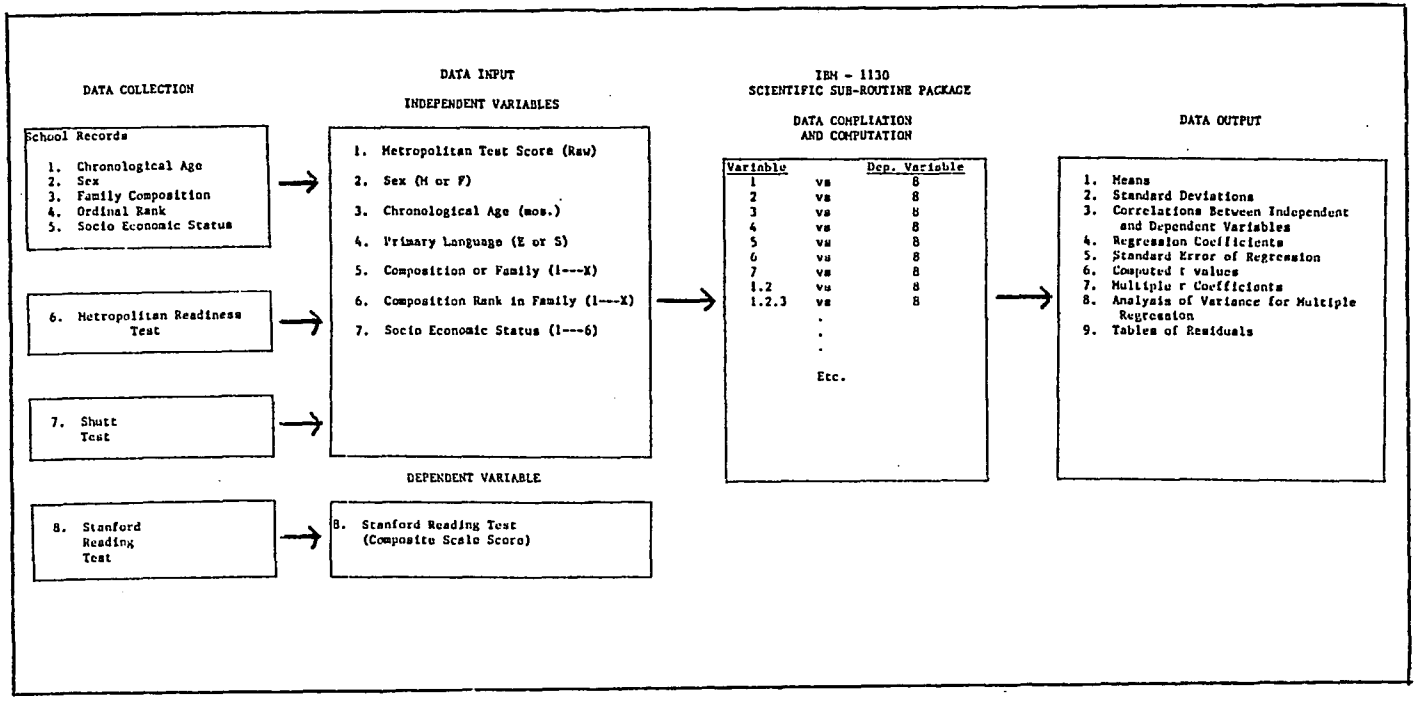
Book B

Book C

Book D

APPENDIX B

DATA FLOW CHART


DATA COLLECTION
School Records
1. Chronological Age
2. Sex
3. Family Composition
4. Ordinal Rank
5. Socio Economic Status
6. Metropolitan Readiness Test
7. Shutt Test
8. Stanford Reading Test
DATA INPUT
INDEPENDENT VARIABLES
1. Metropolitan Test Score (Raw)
2. Sex (M or F)
3. Chronological Age (mos.)
4. Primary Language (E or S)
5. Composition or Family (1---X)
6. Composition Rank in Family (1---X)
7. Socio Economic Status (1---6)
DEPENDENT VARIABLE
8. Stanford Reading Test (Composite Scale Score)
IBM - 1130
SCIENTIFIC SUB-ROUTINE PACKAGE
DATA COMPLIATION AND COMPUTATION
Variable vs Dep. Variable
1 vs 8
2 vs 8
3 vs 8
4 vs 8
5 vs 8
6 vs 8
7 vs 8
1.2 vs 8
1.2.3 vs 8
Etc.
DATA OUTPUT
1. Means
2. Standard Deviations
3. Correlations Between Independent and Dependent Variables
4. Regression Coefficients
5. Standard Error of Regression
6. Computed t values
7. Multiple r Coefficients
8. Analysis of Variance for Multiple Regression
9. Tables of Residuals

APPENDIX C

DATA ASSIMILATION CHART

1. Name _____ Address _____

2. Sex _____ 3. Primary Lang. _____ Father's Occupation _____

4. Age in months (9-1-74) _____ Source of Income _____

Birthdate _____ 5. SES _____

6. Composition of Family M F C S Other _____

7. Ordinal Position _____ of _____

MRT Score 8. Raw Score _____ Letter _____ 9.% _____ Date given _____

SAT Reading Test Date given _____ 14. Teacher _____

	No. Right	Scaled Score	Grade Equiv.	% Rank	Stanine
Test 1: Vocab:					1 2 3 4 5 6 7 8 9
Test 2: Rdg. A					1 2 3 4 5 6 7 8 9
Rdg. B					.1 2 3 4 5 6 7 8 9
A + B					1 2 3 4 5 6 7 8 9
Test 3: Word Study Skills					1 2 3 4 5 6 7 8 9
Total Reading (Tests 2 + 3)		10.	11.	12.	13. 1 2 3 4 5 6 7 8 9

1	
2	
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4	
5	
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