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Date

Robert F. Hills

September 29, 1977

PREDICTION OF FIRST GRADE READING
ACHIEVEMENT IN JOPLIN, MONTANA

by

VIOLET FRANTZICH HILLS

A professional paper submitted in partial fulfillment
of the requirements for the degree

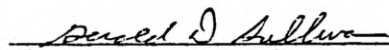
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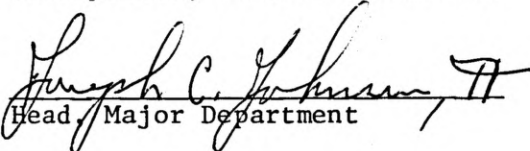
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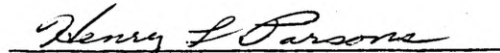
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TABLE OF CONTENTS

VITA	ii
ACKNOWLEDGMENTS	iii
TABLE OF CONTENTS.	iv
LIST OF TABLES	vi
ABSTRACT	vii

Chapter	Page
1. INTRODUCTION	1
STATEMENT OF THE PROBLEM	2
PURPOSE OF THE STUDY	2
GENERAL QUESTIONS TO BE ANSWERED	3
GENERAL PROCEDURE.	4
DELIMITATIONS.	5
DEFINITIONS	5
SUMMARY.	6
2. REVIEW OF LITERATURE	8
Background of Readiness Studies.	8
Readiness.	9
Age as Related to Readiness.	10
Intelligence	11
Sex Differences	11
Readiness Tests.	12
Teacher Rating Scales.	14
Individual Tasks	14
Informal Indexes	15
Perceptual Motor Skills	15
SUMMARY.	19
3. PROCEDURES	21
Population Description and Sampling Procedure.	21
Method of Organizing Data.	28
Statistical Hypotheses to be Tested.	28

Analysis of Data	29
Precautions Taken for Accuracy	30
SUMMARY.	31
4. ANALYSIS OF DATA	33
SUMMARY.	38
5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	39
CONCLUSIONS.	42
RECOMMENDATIONS	43
LITERATURE CITED	44

LIST OF TABLES

Table	Page
1. Summary of Test Scores	34
2. Test Scores Data from Children Tested	35
3. Summary of Data for Multiple Regression Equation	37

ABSTRACT

Perhaps one of the most important concepts in public school teaching is the ability to forecast or predict with some reasonable degree of reliability a child's future performance in any academic area. This becomes even more urgent when the child in question may harbor some learning dysfunction. To be able to accurately identify these potential problem students early in their lives may provide the extra impetus to assure timely placement of the child in one or more of the many excellent remedial programs available in many public schools.

Such early identification and placement could very well shape any future educational endeavors undertaken by the child and, therefore, noticeably alter the child's future ability to make worthwhile contributions to his society and self-satisfaction with a selected life-style.

The general statement of the problem involved determining if significant differences existed between the predictive validity of the readiness test and gross motor skills test scores when compared to reading achievement test scores of the first grade children the Joplin Elementary School during the 1976-77 academic year.

The Murphy-Durrell Reading Readiness Test and the Cratty Six-Category Gross-Motor Test were given as pretest in September, 1976. In May, 1977, the Stanford Achievement Test was administered. Pearson product moment correlation coefficients were determined for the readiness test and the achievement test and for the gross motor skills test and the achievement test. These correlational values were used to calculate the multiple correlation coefficient to determine if significant differences existed between the combined scores of the readiness test and gross motor skills test and the scores of the achievement test. The best possible predictor of the reading achievement total score from the total readiness score in conjunction with the total gross motor skills score was determined by obtaining the regression equation. The multiple regression technique was used to obtain this equation.

No significant differences in the correlational values were detected by this study.

Although those variables selected for testing in this study failed to show significance at the selected level one should not discount the possibility of further research in these same areas or possibility of additional studies to attempt to identify other areas more reliably predicting future reading success among elementary school children.

Chapter 1

INTRODUCTION

Unquestionably, reading is considered by educators to be the most important academic skill for a student to possess. Tinker (1968) stated that as a medium of communication and a tool of learning, reading serves an indispensable function in society and that reading will, undoubtedly, continue to be the paramount means of exchanging ideas and experiences. Literature abounded with studies and data pointing out that those students deficient in reading skills were operating under a serious handicap when compared to students having adequate reading skills. This researcher is aware that not all children are going to be masterful readers. However, if children at an early age could be identified as potentially poor readers, measures could be taken to provide additional instruction in an attempt to combat a permanent future reading deficiency.

Early identification of problem readers and subsequent additional classroom instruction or referrals to existing special education programs may be necessary before acceptable reading proficiency is realized. Testing for relationships between basic cognitive knowledge and common gross motor skills present in first grade children and success in reading achievement could prove valuable to the elementary teacher in her attempt to teach basic reading skills.

STATEMENT OF THE PROBLEM

The problem of this study was to determine if significant differences exist:

1. In the predictive validity between the readiness test total score and the reading achievement test total score.
2. In the predictive validity between the gross motor skills test total score and the reading achievement test total score.
3. In the predictive validity between the union of the readiness and gross motor test scores and the reading achievement test total score.
4. To determine the equation of the best possible prediction to the reading achievement test total score from the total cognitive test score taken in conjunction with the total gross motor skills test score.

PURPOSE OF THE STUDY

This study was important because to nurture growth in future academic attempts and private aims children should learn to read effectively while in school. Reading becomes the avenue for intellectual and emotional growth within one's personal being as well as in his social world (McKee, 1966).

Public elementary school teachers engaged in teaching reading

to first grade children must be able to identify children with possible reading problems. Early correction of these problem readers is important. In persistent cases which the classroom teacher cannot resolve, the child should be referred to remedial programs and other special education processes. These additional programs could result in children with reading deficiencies being brought to an acceptable level of reading ability at a much earlier date (Karlin, 1975).

It is only through adequate reading skills that educators can expect future academic success and social growth from children.

GENERAL QUESTIONS TO BE ANSWERED

The general questions answered by this study were:

1. Do differences in correlation exist at the .05 level of significance between the total score obtained from the readiness test and the total score obtained from the reading achievement test?
2. Do differences in correlation exist at the .05 level of significance between the total score obtained from the gross motor skills test and the total score obtained from the reading achievement test?
3. Do differences in multiple correlation exist at the .05 level of significance between the total scores obtained from combining the readiness test and the gross motor skills test and the total

score obtained from the reading achievement test?

4. What is the equation of the best possible prediction of the reading achievement test total score from the total readiness test score taken in conjunction with the total gross motor skills test score?

GENERAL PROCEDURE

The procedure utilized by this researcher was to pretest all of the first grade children in the Joplin Elementary School during the first month of the 1976-77 academic year utilizing the Murphy-Durrell Reading Readiness Analysis and the Cratty Six-Category Gross-Motor Test. The pretests consisted of selected cognitive and gross motor skills tasks. In May of the 1976-77 academic year, the same children were tested again using the Stanford Achievement Test: Reading Battery. Coefficients of correlation between the readiness test total score and the reading achievement test total score; between the gross motor skills test total score and the reading achievement test total score were determined. Additionally, the multiple correlation coefficient between the union of the total score of the readiness test taken in conjunction with the total score gross motor test and the reading achievement test total score was determined. These correlation coefficients determined critical values and thereby tested each of the statistical hypotheses for differences

at the selected level of significance.

Using the multiple regression technique, the best possible predictor of the reading achievement test total score from the total readiness test score taken in conjunction with the total gross motor skills test score was determined.

DELIMITATIONS

This study was limited to all the first grade children enrolled in the Joplin Elementary School for the 1976-77 academic year. Previous kindergarten experience or sex differences were not considered.

The sources reported in the review of literature were drawn primarily from the Montana State University and the Northern Montana College libraries.

DEFINITIONS

Intelligence, cognitive. "That mental functioning involved in perceiving, knowing and understanding; sometimes measured through the use of problems involving relationships; sometimes restricted to performance in perceptual tasks" (Good, 1973).

Task, cognitive. A task requiring a demonstration of acceptable cognitive intelligence.

Gross motor. "Pertaining to both sensorimotor and ideomotor

phenomena; pertaining to the motor effect of mental or cerebral processes" (Good, 1973).

Task, gross motor. A task requiring a demonstration of acceptable sensorimotor or ideomotor processes.

Test, readiness. "A test of ability to engage in a new type of specific learning; a specialized type of aptitude test most commonly devised for use in the primary grades" (Good, 1973).

SUMMARY

Early correction of elementary school problem readers will facilitate academic and social growth. However, before remediation programs can be implemented those children must be identified. The primary goal of this study was to determine if differences in relationships existed between various gross motor skills test scores and cognitive knowledge test scores and reading achievement test scores of the first grade children in the Joplin Elementary School. These children were tested at appropriate times during the school year to determine scores for readiness, gross motor and reading achievement tests. Statistical analyses were performed to determine if differences in relationships existed between readiness, gross motor and reading achievement test scores.

The next step in this study was to review related literature and research concerning readiness predictions, gross motor skills and

reading achievement. This will be found in Chapter 2.

Chapter 2

REVIEW OF LITERATURE

The method of organizing the related literature for this study provided a setting by describing the complexities of readiness as it referred to the pre-reader. Additionally this study related factors of readiness and perceptual motor skills to first grade reading achievement. Categories of readiness reviewed were age, intelligence, sex differences, readiness tests, teacher rating scales, individual tasks and informal indexes.

Background of Readiness Studies

The importance of the early identification of children who are going to need special help to master the task of reading has long been recognized. Literature dealing with readiness has from the beginning been concerned with components which are indicative of reading readiness and related to prediction of first grade reading achievement. The first predictive study of this type was made prior to 1930 by Dr. Erby Deputy (Hildreth, 1958). His results showed that a reliable test could give accurate predictions of reading achievement by the end of the first grade. Since that time multitudes of studies have been conducted in an attempt to discover what is the best predictor and what areas of readiness need to be stressed.

Readiness

Many children have difficulty in learning to read because they are not ready to master the multi-faceted skills which comprise the reading process. Readiness is a state of being that is a composite of numerous elements which must be measured in various ways. Readiness cannot be taught in the sense of it being a commodity (Carpenter, 1968).

The maturing process constantly involves degrees of readiness. It is a process of successions of related experiences which prepare for learning a skill and eventually to perfecting that skill. Readiness is influenced by many factors: intelligence, chronological age, mental age, maturity, emotional stability, physical or neurological conditions and environment (Spach, 1972).

School readiness has come to be thought of as a product. Most specifically, a product of the kindergarten classroom whose job it is to, supposedly, teach reading readiness so as to assure the success of the child in his future reading endeavors. Under these circumstances reading is looked upon as a cold process from which one can isolate the various steps and work on them (Carpenter, 1968).

Carpenter (1968:114) summarizes by stating: "Readiness lies somewhere between 'wanting to' and 'having to'. It is the solid substance of growth, personality, imagination and self-realization."

Age as Related to Readiness

For years, schools have required the attainment of a certain chronological age as an entrance requirement to first grade. In the United States six years of age is the most common age for first grade admittance (Durrell and Murphy, 1963). Some schools have considered raising this age limit in the belief that the older the child the greater will be his achievement. In fact, the correlation of chronological age to reading achievement is negligible as substantiated by numerous studies conducted by Boston University (Durrell and Murphy, 1963). In follow-up studies through the sixth grade, younger children have equaled the achievement of older children in the classroom.

Research of McGraw and Gesell indicated that growth from one stage to another is a maturational process and that the ability to read fits into one of these stages. Therefore, the teaching of reading should be delayed so that the child will be ready (Durkin, 1970).

Ilg and Ames agreed to the five-year level of behavior for kindergarten entrance but disputed the fact that five years of age assumes five-year behavior. They proposed each child be given an individual behavior examination to determine the level of performance not only upon school entrance but for promotion to succeeding grades (1965).

Intelligence

Intelligence tests have frequently been used in schools as a predictive instrument. Recently these tests have been under fire in some of this country's major school systems on the premise of discrimination against the socially, economically and ethnically disadvantaged. Those in favor of eliminating intelligence tests do not argue against the tests being useful in measuring readiness or ability but rather that comparison by group intelligence tests preserves discriminatory social and educational practices while perpetuating negative self-images (Henderson, 1973). In 1967, Durkin reported no correlation between intelligence and reading achievement. Research indicated that achievement tests are better predictors of reading success at the primary level than are intelligence tests (Feldhusen, 1970).

Sex Differences

Durrell and Murphy (1963) reported the superiority of girls to boys at all levels of reading readiness. At least eight studies demonstrated girl superiority in letter knowledge and in auditory discrimination. Differences in mental age and vocabulary background is insignificant. Boys showed a lower perception ability for word elements at school entrance age levels.

Readiness Tests

It was neither possible nor practical to attempt to test individually each first grade student on all of the factors influencing his reading readiness. Because of this educators often turned to group testing which required less time and less special training to administer. Even group testing presented problems as the age groups involved required small grouping and short testing periods. Most important, many preschool tests, whether they be individual or group tests, were not adequate in reliability and validity (Panther, 1968).

Allen and others (Durrell and Murphy, 1963) analyzed readiness materials and categorized the exercises they contained. Testing each category resulted in the following correlations as related to achievement: Language development, .38; visual discrimination of pictures and nonword forms, .45; motor skills, .17; nonword sounds, .36; auditory perception, .60; and visual matching of words, .55.

The usual procedure for the predictive studies with which this paper concerned itself was to use a readiness test as a pretest at the end of the kindergarten year or early in the first grade. Many tests and test combinations have been tried; most with correlations below .50. It became difficult to make comparisons on

such tests because of the wide range of populations used and the variety of achievement tests used for post-testing. An example of this circumstance is with the Lee-Clark Reading Readiness Test (1962). At least three studies reported coefficients of correlation of .66 to the Metropolitan Achievement Test (Lessler, 1970). Berwick (Durrell and Murphy, 1963) found a correlation of .47 using the Lee-Clark test.

Betts observed as early as 1943 (Barrett, 1965) that all readiness tests of that time contained sections which required some kind of visual discrimination. Barrett's study, as with others, ranked discrimination of letters and numerals, patterns and words highest in correlation. However, it was concluded that their ability to predict was not precise enough to be used alone as a readiness predictor. It is necessary to evaluate in other readiness areas such as auditory discrimination and language facility. Benenson (1974) reinforced this conclusion by suggesting that perhaps the auditory modality or an auditory-visual integration are of greater importance in predicting first grade achievement in reading than is the visual modality by itself.

Studies in auditory discrimination are extremely difficult to perform at the pre-reading level because some knowledge of letters and sounds must have been gained before a meaningful measurement can

be obtained. Tests requiring the child to circle pictures that begin with particular sounds have shown correlations of .47 to .66 (Durrell and Murphy, 1963).

Teacher Rating Scales

Teacher rating scales have been yet another predictor of child achievement. Generally they were used for behavioral or emotional problem determinations. Rating scales were popular because they were relatively inexpensive and the data base rating was large. Whether the observation was done by the teacher or by an unconcerned observer could have had considerable influence upon scoring but was an area where little research had been completed.

Children in school were on task about 75 percent of the time which increased the probability of positive behavior. Research showed high intercorrelational relationships with reading achievement decreasing as disorder increased. Camp (1974) reported high interrelation between lack of off-task behavior, mental age and reading achievement. Children with high rates of off-task behavior were likely to have lower mental ages, poorer achievement and lower teacher ratings of positive behavior.

Individual Tasks

Individual tasks were objects of study not with the intention of being the sole predictor of achievement but merely one task in the

total assessment aimed at early identification of reading problems. One such investigation involved a Piagetan based activity demonstrating conservation of numbers in kindergarten. When tested at the end of second grade 69.57 percent of the children who conserved were adequately good readers. Only 24.14 percent of the children tested who conserved were poor readers. The mean score for all who conserved was higher than the mean for those who did not conserve (Dimitrovsky, 1975).

Informal Indexes

Research indicates that experienced teachers are as capable of predicting readiness as are most tests or rating scales (Zaruba, 1968; Koppman and LaPray, 1969; Henig, 1949; Keogh, 1973). Some teachers are better predictors than others because of the criteria by which they judge. The more closely the criteria is related to beginning reading achievement the more valid their judgment (Karlin, 1975).

Perceptual Motor Skills

Newell C. Kephart, a clinical psychologist, proposed that motor learning was basic to all learning. Kephart developed a program that emphasized perception and learning more than the neurological aspect.

The Kephart program was based on six motor generalizations:

1. Posture and balance - necessary for child to be able to make perceptual judgments from the orientation of his own body.
2. Locomotor - helps child learn his relationship to his world.
3. Contact - manipulative skills which aid in awareness of objects, shapes and textures.
4. Receipt and propulsion - throwing and catching activities for concepts of velocity, sizes and distances.
5. Body image - for experiences of body movement in various ways and in various media.
6. Laterality - coordination of one side of body to the other and knowledge of right from left.

Kephart suggests that with these generalizations a child organizes his world perceptually to make sound intellectual functioning and that a child lacking in motor coordination is likely to be intellectually incapable (1964).

Bloom's study pointed out the difficulty of predicting later I.Q. scores from perceptual-motor evaluation in young children (1964).

Bayley categorized infant abilities into six attribute areas:

1. Visual following
2. Social responsiveness
3. Perceptual interest

4. Manual dexterity
5. Vocalizations, and
6. Object relations.

Bayley found only the quality of vocalization to correlate with later I.Q. scores and only at about eight years of age. Only at this age can predictability be accomplished with a reasonable degree of accuracy (1965).

Brown found some perceptual measures improved by the Kephart program but no significant reading improvement (Cratty, 1969).

Rutherford studied the effects of Kephart's program on the Metropolitan Readiness Test for kindergarten children and found significant improvement for boys (Cratty, 1969).

First graders low in reading and visual perception were studied by LaPray and Ross. One group, after being trained in simple reading materials, improved in reading while another group trained in large-muscle and visual skills improved in those areas but not in reading. Generally, researchers using Kephart's program to determine effects on reading find negative results (Cratt, 1970).

Delacato's program is based on neural function. Delacato maintains that training in specific locomotor tasks positively influences various brain centers which, as a result, influence perceptual and cognitive functioning (1959).

Anderson tried cross-patterning and creeping with kindergarten and intermediate grade children. It was found that those with lower I.Q.'s did not improve in initial reading ability. McCormick, Panther and Schnobrick also found no significant changes when using Delacato's program with first grade children (Cratty, 1970).

Similar to the Kephart program, Getman proposes movement to be the basis of intellectual development. This program emphasizes vision which encompasses more than visual perception and includes memory and intellectual processes. Getman claims that 85 to 90 percent of a child's learning is through visual means. Therefore, deficiencies in the visual mechanism lead to learning problems (Cratty, 1970).

Getman maintains that most six year old children have not acquired adequate neuromuscular control needed for tasks such as reading. Getman contends that if children are prematurely introduced to reading it may impair their visual-perceptual mechanisms. Research suggests the opposite may be true (Cratty, 1970).

Studies of forty years ago found induced muscular tension to improve the ability to make perceptual discriminations quickly and to memorize word and letter sequences (Cratty, 1970). Recent studies demonstrate that too high a level of activity can inhibit learning. Semmels (1965) found children who could not sit in a chair to be less capable at learning than some retardates who remained

relatively fixed. Harrison (1966) found relaxation training improved children's learning capacities.

Emotional stability, intelligence and perceptual competence are characteristics of individuals capable of adjusting their arousal level to the task at hand. The child who is unable to adjust appropriately, frequently has learning difficulties (Cratty, 1965).

Chissom investigated the relationship between motor ability and academic achievement and aptitude. At the .01 level the correlation was significant for first grade boys but not for third grade boys. It was concluded that programs such as Getman's and Kephart's are more applicable to boys of earlier age and that, possibly, perceptual motor training is of the most value to the young (1971).

SUMMARY

Numerous studies have been conducted in an attempt to discover the best predictor for reading readiness and what areas of readiness would assure reading success. The complexity of readiness has channeled research into recognizable areas wherein data could be measured such as age, intelligence, sex differences, readiness tests, rating scales, individual tasks and informal indexes.

Mental age generally had a higher correlation to achievement than did chronological age. Correlation appears to be higher for

achievement tests than intelligence tests. Studies report girl superiority in all stages of reading readiness. Auditory perception shows a higher correlation with achievement than any other category of readiness materials. Readiness test sections concerned with discrimination of letters, numerals, patterns and words ranked highest in correlation but not sufficiently high so as to be an independent predictor. Teacher rating scales, frequently used for behavior or emotional problem determination, showed high correlation with reading achievement decreasing as disorder increased. In spite of all the predicting techniques tried, research indicated that experienced teachers were as capable of predicting readiness as were most tests and scales.

Researchers have theorized about the contribution of perceptual motor skills to the field of academic achievement. Many factors influencing readiness also influenced motor activity.

Chapter 3 describes the procedures, testing instruments, organization and hypotheses used in this study.

Chapter 3

PROCEDURES

The general statement of the problem involved whether significant differences existed between the predictive validity of the readiness test and gross motor skills test scores when compared to the reading achievement test score of the first grade children enrolled in the Joplin Elementary School during the 1976-77 academic year.

This researcher organized the following chapter to provide a meaningful continuous description of the population under study, methods to be employed in the collection of pertinent test data, selected statistical hypotheses and the subsequent analysis of these data.

Population Description and Sampling Procedure

Inasmuch as motor and readiness skills tests were not entirely free from contaminating factors this researcher selected for this study commercially prepared tests which were used to determine the readiness and gross motor skills test scores. It was felt that the established validity and reliability of professionally recognized testing instruments added materially to the accuracy of the findings of this study and therefore maintained possible test score inaccuracies to a minimum.

The Murphy-Durrell Reading Readiness Analysis Test (1964) was used as a pretest early in the academic year to establish the scores for the readiness area. The Cratty Six-Category Gross-Motor test (1969), also given as a pretest early in the academic year, was the instrument used to test gross motor ability. Lastly, each first grade child was administered the Stanford Achievement Test: Reading Test Battery during the last month of the academic year.

The Murphy-Durrell Reading Readiness Analysis Test (1964) consisted of three subtests. These subtests were:

1. The Phonemes Test. This test provided an inventory of the child's ability to identify sounds in spoken words. This test established a reliability coefficient of .94 and a standard error of measurement of 2.5.

2. The Letter Names Test. This test measured the child's ability to identify capital and lower-case letters named by the test administrator. The Letter Names Test had a total reliability coefficient of .97 and a standard error of measurement of 2.4.

3. The Learning Rate Test. This test measured the number of words a child recognized one hour after the test material was presented. The reliability coefficient of this test was .88 and had a standard error of measurement of 1.5.

The Murphy-Durrell Reading Readiness Analysis test, thought to be one of the best reading readiness tests (Buros, 1972), is an

outgrowth of the original test first published in 1949. Murphy and Durrell (1965) considered the phonemes test to be of primary importance in beginning reading. Many children of school age gained their speaking vocabularies through imitation without realizing the individual sounds which compose the word. High intelligence does not assure the ability to recognize separate sounds but most non-readers of high intelligence are deficient in this skill.

Only consonant sounds were utilized in the phoneme test because of their stability; vowel sounds are too variable. The consonants were mostly used in initial position with a few in final position.

Knowledge of letter names is a significant step toward a child's reading achievement. Many letter names contain the sound of the letter plus a vowel to facilitate pronouncing the letter name. It should be easy to go from the letter name to the letter sound. Children accurately identifying letter names learn to read more readily than those children unable to identify letter names (Murphy-Durrell, 1965).

The Murphy-Durrell test required children to respond to letters named by the test administrator. The difficulty of this test item depended to a great degree upon the choice of the word alternatives offered to the child. If isolated from similar appearing letters, letters "b", "d", "p", and "q" should easily be identified.

However, children must learn to distinguish "b", "d", "p", and "q" from all the other letters.

The intercorrelation between the Learning Rates Test and the Phonemes or Letter Names Test was lower than other Murphy-Durrell subtests used in this study. The purpose of the Learning Rates Test was to test the number of new words a child was able to learn in one day of instruction under normal classroom conditions.

Nine words were used for the Learning Rates Test: yes, tongue, hair, swim, walk, fly, round, clean and heavy. Each word was systematically presented to the child in three different ways: printed on the chalkboard, printed on a flashcard and appearing in the test booklet. After one hour the children were tested to determine the number of words learned.

The Murphy-Durrell Reading Readiness Analysis test was designed for use at the beginning of the first grade. Therefore, norms were established specifically for the first four to six weeks of the first grade. Reliability of the subtests as well as the total test was established at .90.

The Cratty Six-Category Gross-Motor Test consisted of the following six categories: body perception, gross agility, balance, locomotor agility, ball throwing and ball tracking. The children were tested in each category at two different levels. The norms for

this test vary with age and sex. Male norms were based upon a sample of 172 boys and 183 girls provided the female norms.

The Stanford Achievement Test: Reading Test Battery (1972) contained the following three major categories:

1. The vocabulary category measured the verbal competency the child had at the beginning of the first grade. This score was included as a diagnostic aid for language development. Vocabulary category had a reliability coefficient of .87 and a standard error of measurement of 2.5.

2. The reading category consisted of three subsections: word, comprehension and word plus comprehension. The reading portion essentially measured the child's ability to decode; that is to go from the printed symbols to the spoken word. The comprehension subsection measured the child's understanding of explicit and implicit sentence meaning. This subsection had a reliability coefficient of .95 and a standard error of measurement of 2.5.

3. In the word study skills category response words were selected enabling the child to decode the word if he had learned the specific skill required by the particular word. These words were selected from first grade listening vocabularies. A reliability coefficient of .94 and a standard error of measurement of 2.8 were recorded for this category.

The Stanford Achievement Test: Reading Battery, 1972 edition, was designed to serve two functions. First of these functions was to compensate for rapid changes in elementary school curriculum since previous editions and, secondly, to update previously established reading test norms. Buros regarded these Stanford tests as the best series of reading tests now published for annual or semi-annual reading achievement surveys (1972).

The major goals of this edition were to assure that content material of the tests parallel present educational objectives and to measure what reading skills were being taught in the classroom. To achieve these goals analysis of widely used textbook series, courses of study, various literature concerning children's concepts and experiences and vocabulary were performed.

The Stanford Vocabulary Test was presented orally in order to better control student reading ability variations. One-half of the items appearing in the test were content dependent and contain vocabulary common to elementary school textbooks. The remainder of the vocabulary test was composed of words in general usage and appeared in texts normally employed in the teaching of language arts.

The Stanford Reading Test consisted of three parts: word reading, reading comprehension and word plus comprehension. Word reading measured word-picture matching skills. These words were

selected from a sample list generally taught in grades one and two. The child could identify the words through his sight vocabulary or by applying his knowledge of phonics. Since these words were in the average child's speaking and listening vocabulary the word reading test essentially measured the ability to decode: go from the printed symbols to the spoken word.

The reading comprehension test items progressively increased in difficulty from a single sentence to a five sentence paragraph. The sentences utilized vocabulary usual to primary grade children and subject content appealing to a wide variety and range of children's interests. The comprehension skills of explicit meaning, recall, or identification of details and main ideas clearly stated in the test and implicit meaning or the use of context clues were determined through the use of this test.

The word study skills test was a tool providing a means of phonics measurement. Pupils were required to choose one word from among three options which differed from the correct answer only with respect to the phonetic skill to be tested. Test items were categorized as follows: consonant sounds, consonant clusters, consonant diagraphs, vowel sounds, vowel plus "r" combinations, silent consonants and diphthongs.

All of the tests used in this study could be presented by the classroom teacher and required no special tools or techniques

to administer.

Method of Organizing Data

The method of organizing data obtained from testing was through the use of tables. These tables provided a framework for the test scores of the separate categories for each of the three testing areas as well as the two pretests and the reading achievement test.

Statistical Hypotheses to be Tested

The statistical hypotheses tested in this study were as follows:

Hypothesis 1. There was no significant difference at the .05 level of significance in the correlation coefficient of the scores obtained from the selected readiness test and the scores obtained from the reading achievement test.

Alternate Hypothesis 1. There was a significant difference at the .05 level of significance in the correlation coefficient of the scores obtained from the selected readiness test and the score obtained from the reading achievement test.

Hypothesis 2. There was no significant difference at the .05 level of significance in the correlation coefficient of the scores obtained from the selected gross motor skills test and the

score obtained from the reading achievement test.

Alternate Hypothesis 2. There was a significant difference at the .05 level of significance in the correlation coefficient of the scores obtained from the selected gross motor skills test and the score obtained from the reading achievement test.

Hypothesis 3. There was no significant difference at the .05 level of significance in the correlation coefficient of the combined scores of the selected readiness and gross motor skills tests and the score obtained from the reading achievement test.

Alternate Hypothesis 3. There was a significant difference at the .05 level of significance in the correlation coefficient of the combined scores of the selected readiness and gross motor skills tests and the score obtained from the reading achievement test.

Analysis of Data

In order to determine the degree of predictability or association between the dependent and independent categories involved in this study the Pearson product-moment correlation coefficient was determined for Question 1. Question 1 states, "Do differences exist at the selected level of significance in the correlation coefficient obtained from comparing the readiness test score and the total score obtained from the reading achievement test?"

The Pearson product-moment correlation coefficient was also

determined for Question 2. Question 2 states, "Do differences exist at the selected level of significance in the correlation coefficient obtained from comparing the gross motor skills test score and the total score obtained from the reading achievement test?"

The above determined correlational values were used in the multiple correlation coefficient calculation to determine if a difference at the chosen .05 level of significance existed between the combined scores of the selected readiness and gross motor skills tests and the scores obtained from the reading achievement test.

The best possible predictor of the reading achievement test total score from the total readiness test score taken in conjunction with the total gross motor skills test score was determined by obtaining the regression equation for the scores of the readiness and gross motor skills tests and the reading achievement test (Ferguson, 1971). The multiple regression technique was used to obtain this equation.

All hypotheses were tested at the .05 level of significance. This level of significance provided sufficient protection against committing type I or type II errors.

Precautions Taken for Accuracy

All computations were carried out using the Joplin School's electronic computer.

SUMMARY

As a measure of accuracy, standardized tests were selected as testing instruments for the entire first grade population of the Joplin Elementary School. The Murphy-Durrell Reading Readiness Analysis test and the Cratty Six-Category Gross-Motor test were given as pretests early in the 1976-77 academic year. Near the finish of this academic year the Stanford Achievement Test was administered.

The Murphy-Durrell Reading Readiness Analysis test contains three subtests: the Phonemes Test, the Letter Names Test and the Learning Rate Test.

Body perception, gross agility, balance, locomotor agility, ball throwing and ball tracking comprise the Cratty Six-Category Gross-Motor Test.

The three subtests of the Stanford Achievement Test: Reading Test Battery were: vocabulary, reading and word-study skills.

Results of the tests and the statistical analyses were organized in tables. Pearson product-moment correlation coefficients were determined for the two pretests to the achievement test. These correlation values were used in a multiple correlation to determine the degree of significance of the combined test scores. Using the regression technique the best possible predictor equation was derived.

A detailed analysis of data will be discussed in Chapter 4.

Chapter 4

ANALYSIS OF DATA

Twelve first grade children were tested by this researcher. Each child completed the entire test battery consisting of the gross motor skills test, the readiness test and the reading achievement test. Table 1 presents and summarizes the data obtained from each of the above test score areas for each child tested. The children's anonymity has been guaranteed by associating each child with a numerical value rather than his name.

Table 1

Summary of Test Scores

Child	Reading Achievement Test Score; X_1	Readiness Test Score; X_2	Gross Motor Test Score; X_3
1	123	116	46
2	117	97	33
3	126	113	44
4	151	117	45
5	182	117	44
6	132	116	49
7	129	115	52
8	141	112	49
9	132	118	51
10	131	117	45
11	126	112	48
12	138	117	41
Range	117-182	97-118	33-52
Mean	135.6667	113.9167	45.5833

Reading achievement test scores had a mean of 135.6667 and a range of 117 to 182. Readiness test scores had a mean of 113.9167 and a range of 97 to 118. The Gross Motors test scores had a mean of 45.5833 with a range of 33 to 52.

In order to determine whether or not significant differences existed between the total scores of the reading achievement test scores and the readiness test scores, between the scores of the

reading achievement and the gross motor skills test and between the reading achievement and the amalgamation of the readiness test scores and the gross motor skills test scores the determination of the Pearson product-moment correlation coefficient between the aforementioned test categories was determined and tested at the selected level of significance, alpha equal to .05. This level of significance was selected as it provided reasonable protection from making either type I or type II errors.

Table 2 presents and summarizes data generated by the tests in the three selected areas affected by this study.

Table 2

Test Scores Data From Children Tested

Test	Test Score Totals	Variance	Degrees of Freedom	Pearson Corr Coefficient	Multiple Cor Coef.
Readiness Reading Achievement	1367 1628	32.6287 291.3333	10	0.429	---
Gross Motor Reading Achievement	547 1628	25.9015 291.3333	10	0.078	---
Readiness Gross Motor Reading Achievement	1367 547 1628	32.6287 25.9015 291.3333	2, 9	----	0.016

Critical value of rho, alpha .05, 10 degrees of freedom is 0.576
 Critical value of F, alpha .05, 2 and 9 degrees of freedom is 4.260

At the selected level of significance there were no significant differences between the total test scores obtained from the reading achievement test and the readiness test. Therefore, Hypothesis 1 which stated there were no significant differences at the .05 level of significance in the correlation coefficient of the scores obtained from the selected readiness test and the scores obtained from the reading achievement test was accepted.

At the selected level of significance there were no significant differences between the total test scores obtained from the reading achievement test and the gross motor skills test. Therefore, Hypothesis 2 which stated there were no significant differences at the .05 level of significance in the correlation coefficient of the scores obtained from the selected gross motor skills test and the scores obtained from the reading achievement test was accepted.

At the selected level of significance there were no significant differences between the total test scores obtained from the reading achievement test and the union of the gross motor skills and readiness test scores. Therefore, Hypothesis 3 which stated there were no significant differences at the .05 level of significance in the multiple correlation coefficient of the scores obtained from the reading achievement test and the union of the scores obtained from the gross motor skills test and the readiness

test was accepted.

In order to most accurately predict a future reading achievement test score from previously determined gross motor skills test scores and readiness test scores the regression equation expressing the relationship between these three variables was determined from the data. Table 3 summarizes the data required for the regression equation determination.

Table 3
Summary of Data for Multiple Regression Equation

Test	Pearson Product Correlation Coef.	Variance	Standard Deviation
Reading Achievement	0.429	291.3333	17.0685
Readiness		32.6287	5.7122
Reading Achievement	0.078	291.3333	17.0685
Gross Motor Skills		25.9015	5.0894
Gross Motor Skills	0.680	25.9015	5.0894
Readiness		32.6287	5.7122

The required beta values to be utilized in the regression equation were determined to be as follows: beta 2 equaled 0.6996; beta 3 equaled -0.3983. Substituting those values obtained from Table 3 and the above beta values in the general multiple regression equation format (Ferguson, 1971) yields the following equation:

$$X'_1 = 2.0904X_2 - 1.3358X_3 - 41.5817.$$

X'_1 is the predicted reading achievement score obtained from the knowledge of a gross motor skills test score, X_3 ; and a readiness test score, X_2 .

SUMMARY

Twelve first grade children were tested in the areas of readiness, gross motor skills and reading achievement.

The correlation between the readiness test and the achievement test scores was 0.429. This value lies below that required to reject the null hypothesis at the selected .05 level of significance. The null hypotheses were also accepted for the gross motor skills test scores and the reading achievement test scores, correlation 0.978, and the combined scores for the readiness test and the gross motor test and the reading achievement test scores, multiple correlation 0.016, as these correlational values failed to provide differences at the selected level of significance.

The regression technique was utilized to determine the most accurate prediction equation obtainable from the relationships of the three variables concerned in this study.

The summary, conclusions and recommendations of this study follow in Chapter 5.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Early correction of elementary school problem readers will facilitate academic and social growth within these children. However, before remediation programs can be implemented those children with reading problems must be identified. The primary goal of this study was to determine if differences in relationships existed between various gross motor skills test scores and cognitive knowledge test scores and reading achievement test scores of the first grade children in the Joplin Elementary School. These children were tested at appropriate times during the school year to determine scores for readiness, gross motor and reading achievement tests.

As noted within, numerous studies have been conducted in the past in an attempt to discover the best predictor for reading readiness and what areas of readiness would assure reading success. The complexity of readiness has channeled research into recognizable areas wherein data could be measured such as age, intelligence, sex differences, readiness tests, rating scales, individual tasks and informal indexes.

Mental age generally had a higher correlation to achievement than did chronological age. Correlation appears to be higher for achievement tests than intelligence tests. Studies report girl superiority in all stages of reading readiness. Auditory perception

shows a higher correlation with achievement than any other category of readiness materials. Readiness test sections concerned with discrimination of letters, numerals, patterns and words ranked highest in correlation but not sufficiently high so as to be an independent predictor. Teacher rating scales, frequently used for behavior or emotional problem determination, showed high correlation with reading achievement decreasing as disorder increased. In spite of all the predicting techniques tried, research indicated that experienced teachers were as capable of predicting readiness as were most tests and scales.

Researchers have theorized about the contribution of perceptual motor skills to the field of academic achievement. Many factors influencing readiness also influenced motor activity.

To assure a measure of accuracy, standardized tests were selected as testing instruments for the entire first grade population of the Joplin Elementary School. The Murphy-Durrell Reading Readiness Analysis test and the Cratty Six-Category Gross Motor test were given as pretests early in the 1976-77 academic year. Near the finish of this academic year the Stanford Achievement Test was administered.

The Murphy-Durrell Reading Readiness Analysis test contains three subtests: The Phonemes Test, the Letter Names Test and the Learning Rate Test.

Body perception, gross agility, balance, locomotor agility, ball throwing and ball tracking comprise the Cratty Six-Category Gross-Motor Test.

The three subtests of the Stanford Achievement Test: Reading Test Battery were: vocabulary, reading and word-study skills.

Results of the tests and the statistical analyses were tabulated. Pearson product-moment correlation coefficients were determined for the two pretests to the achievement test. These correlation values were subsequently used in a multiple correlation design to determine if significant differences between the combined test scores existed. Using the regression technique an equation defining the best possible predictor obtained from the relationship of the three variables in this study was obtained.

Statistical analyses were performed to determine if differences in relationships existed between readiness, gross motor skills and reading achievement test scores existed.

The correlation between the readiness test and the achievement test scores was 0.429. This value lies below that required to reject the null hypothesis at the selected .05 level of significance. The null hypothesis were also accepted for the gross motor skills test scores and the reading achievement test scores, correlation 0.078, and the combined scores for the readiness test and the gross motor test and the reading achievement test scores,

multiple correlation 0.016, as these correlational values failed to provide differences at the selected level of significance.

CONCLUSIONS

The following were concluded from this study:

1. At the selected level of significance no differences were detected in the correlational values generated by this study. This indicated that the selected readiness test and gross motor test are not acceptable indicators as defined by this study of predicting elementary school children's reading readiness.

2. The regression equation enabling the reading achievement score to be predicted from gross motor skills score and a readiness test score was determined from the data generated for this study. Only 26 percent of the achievement scores can be attributed to factors measured by this study. The remaining percentage results from other factors. The application of this relationship between the three variables concerned in this study will provide an estimate of reading readiness from a knowledge of gross motor skills and cognitive responses.

3. None of the factors involved in this study produced significant correlational relationships. This is not to say there do not exist those areas heretofore untested that may produce acceptable reading prediction qualities.

RECOMMENDATIONS

This researcher offers the following recommendations:

1. It is recommended that the alteration or enlargement of those test areas used in this study be employed as they could possibly prove statistically significant.
2. It is further recommended by this researcher that those tests utilized in this study be given to children from other locations both within and without the state in an attempt to ascertain whether statistical significance might be forthcoming and thus help identify probably poor reading achievers.

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