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A Study of the Betts Ready to Read Tests: Their Predictive Values in Determining Reading Achievement and Their Comparison with Other Predictive Measures

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A STUDY OF THE
BETTS READY TO READ TESTS

THEIR PREDICTIVE VALUES IN DETERMINING READING ACHIEVEMENT AND THEIR COMPARISON WITH OTHER PREDICTIVE MEASURES

By

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This thesis, directed and approved by the candidate's committee, has been accepted by the Graduate Committee of the University of New Mexico in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

The ability to read is basic to the acquisition of knowledge in all school subjects. Consequently, classroom teachers have long been interested in what determines readiness for reading, and in tests which will predict reading achievement. Prominent among those which have appeared in recent years is the Betts Ready to Read Tests[1] which in reality are a series of twelve individual vision tests that require expensive equipment, a great deal of time, and a certain amount of technical skill to administer, score, and interpret.

I. THE PROBLEM

Statement of the problem. The purposes of this investigation are (1) to determine the predictive values of the factors of binocular vision in reading readiness, as measured by the Visual Sensation and Perception Tests of Betts Ready to Read Tests, and (2) to compare the relative values of the Betts tests as measures of probable future success in reading with those of other group and individual standardized and non-standardized predictive instruments.

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[1] Emmett Albert Betts, Betts Ready to Read Tests (Meadville, Pennsylvania: Keystone View Company, 1936.)

Importance of the problem. The average teacher is confused by the claims being made for the many prognostic tests now being used to predict success in learning to read. Consequently, if this investigation can either prove that the Betts tests are worth the time, expense, and technical training they involve, or that other more simple prognostic tests are equally as good, a great service will have been rendered education.

Delimitation. The scope of this investigation is limited to all regularly enrolled beginning first grade pupils, in the Hobbs, New Mexico, public schools, who were in regular attendance during the school year 1937-1938, regardless of individual differences in home background, mental ability, educational opportunity, physical maturity, general health, chronological age, and psychological factors peculiar to the developmental age of young children.

II. DEFINITIONS OF TERMS USED

Beginning first grade pupils. Beginning first grade pupils are children entering the first grade of the public elementary schools for the first time.

Binocular vision. Throughout the report of this investigation, the term "binocular vision" shall be interpreted as meaning the co-ordinate action of the eyes.

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III. DEFINITION OF THE [illegible]

Beginning first grade pupils. Beginning first grade pupils are children entering the first grade of the elementary school for the first time.

Standard tests. [illegible] the [illegible] investigation, the term [illegible] tests [illegible] preted as meaning the [illegible] tests [illegible] the [illegible].

Prognosis. The term "prognosis" and its derivatives are used in this investigation in referring to the predictive values which certain reading readiness and eye conditions tests possess for indicating future success in reading.

III. SOURCES OF THE DATA

In determining the importance of the factors of binocular vision in reading readiness, 167 beginning first grade pupils enrolled in six classrooms in the Hobbs, New Mexico, public schools during the 1937-1938 term of school were examined individually in September, 1937, by the writer and two assistants on each of the twelve tests included in the Visual Sensation and Perception Tests of the Betts Ready to Read Tests, and rated as passing or failing each test. The data thus secured were used to determine the correlations between the factors of binocular vision in reading readiness and reading achievement.

In comparing the results of the Betts tests of the factors of binocular vision in reading readiness with those of the other predictive instruments administered in September, 1937, to the 167 beginning first grade pupils included in this investigation, the raw scores made by the pupils on these other tests were correlated with the scores on the same measures of reading achievement.

The data used as measures of reading achievement and

for determining the correlations between all predictive instruments included in this study and success in reading consisted of the raw scores made on (1) the Detroit Word Test, (2) the Betts Oculmotor and Perception Habits Tests, Level One, (3) the Metropolitan Achievement Test, Form A, (4) teacher's marks in general scholarship, (5) the Metropolitan Reading Test, Form A, and (6) teacher's marks in reading scholarship in May, 1938.

IV. METHOD OF PROCEDURE

This study was conducted in a normal public school situation, wherein all the variations common to any given school population might be present. Special care was used to preserve the same plan of grouping pupils for instructional purposes and the usual methods of instruction practiced in first grade public school classrooms, by urging that all teachers concerned follow their customary routine of procedures.

In selecting the 167 cases used in this investigation only those pupils were included who (1) were beginning first grade pupils regularly enrolled in the Hobbs, New Mexico, public schools during the 1937-1938 term of school; (2) had no previous public school experience; and (3) were actually in school when the predictive tests were given in September, 1937, and when the achievement measures were administered.

V. ORGANIZATION OF REMAINDER OF THESIS

The remainder of this thesis is divided into five chapters. Chapter II presents a review of related literature.

Chapter III is an outline of the procedure followed by the investigator in making this study.

Chapter IV is concerned with a study of the correlation between the binocular factors of reading readiness as determined by the Visual Sensation and Perception Tests of Betts Ready to Read Tests, (administered in the fall of 1937), and success in learning to read as revealed by standardized tests and teacher's marks (administered in the spring of 1938).

Chapter V sets forth a comparative study of the correlation between other standardized reading readiness tests, including teacher's ratings of first grade pupils (administered in the fall of 1937), and reading achievement as revealed by standardized tests and teacher's marks (administered in the spring of 1938).

The final chapter gives a summary of the findings and presents the conclusions of the investigation.

CHAPTER II

REVIEW OF RELATED LITERATURE

Many recent investigations of the relationship between reading readiness and reading achievement have been made on the assumption that the co-ordinate visual efficiency or the binocular co-ordination of the eyes is essential to success in learning to read.

I. REVIEW OF RELATED STUDIES

Betts,[2] who is one of the leaders in the field of visual readiness for reading and who has developed tests to reveal visual defects, states that the binocular co-ordination required in reading was not subject to scientific study until the development of the material on "visual sensation and perception" and "oculmotor habits" used in the Betts Ready to Read Tests. His very excellent description of the tests follows:

> The Betts Ready to Read Tests are devised to appraise the co-ordinate action of the eyes. The chief factors contributing to the validity of the tests of visual sensation and perception are: First, each eye is tested

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[2] Emmett Albert Betts, "A Physiological Approach to the Analysis of Reading Disabilities," The Educational Research Bulletin, 13:135-40, 163-74, September 19 and October 17, 1934.

independently while both eyes are seeing. This is accomplished by a disociation of the eyes. The eye which is not being tested can look at a blank surface, while the seeing eye is being tested without the subject's awareness of the phenomena. Second, binocular co-ordination which is essential to rapid and efficient reading habits is appraised. Muscle imbalance, near-point and far-point fusion, and steropsis level are tested. Third, binocular acuity, as well as the acuity of each eye, is tested.[3]

Wagner,[4] in investigating the maturation of certain visual functions and the relationship between these functions and success in reading and arithmetic, used the Betts Ready to Read Tests for measuring certain physiological functions of the eye which are related to binocular vision. The tests were given during the last month of the school year to 850 children in grades kindergarten to six, inclusive, of the Syracuse, New York, public schools. The test scores were correlated with teachers' marks for the same year in reading and arithmetic. He concluded:

The differences in visual functioning between good and poor readers are small, and in some cases, perhaps, due to chance. However, the fact that in almost every case the difference favors the good readers supports the general hypothesis that visual ineffiencies, as revealed by the Betts battery, are basically associated

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[3] Ibid., p. 164.

[4] Guy W. Wagner, "The Maturation of Certain Visual Functions and the Relationship Between These Functions and Success in Reading and Arithmetic," (Psychological Monograph No. 215 Iowa City, Iowa, University of Iowa, 1937), pp. 108-146.

with poor reading at the age levels considered in this study.5

Selzer[6] constructed stereoscopic tests for studying lateral balance and distance fusion, and examined thirty-three poor readers and one hundred unselected school children. Ninety per cent of the poor readers displayed heterophoria, while only nine of the one hundred unselected school children exhibited similar defects. His conclusions were:

> Conditions of muscle imbalance and alternating of vision, in addition to a lack of fusion, . . . account for such reading disability as are not accounted for by general mental disability. The lack of visual fusion is due to muscle imbalance that has existed from birth or early infancy.[7]

Witty and Kopel[8] investigated the relationship between visual defects and reading disability. Their experimental group consisted of the one hundred poorest readers in grades three to six, inclusive, of the Evanston, Illinois, public schools. A control group was selected from the same grades and schools. All children were examined for eye con-

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[5] Ibid., p. 146.

[6] Charles A. Selzer, "Lateral Dominance and Distance Fusion." (Harvard Monographs in Education, No. 12 Cambridge, Massachusetts: Harvard University Press, 1933), 119 pp.

[7] Ibid., p. 119.

[8] Paul A. Witty and David Kopel, "Heterophoria and Reading Disability," Journal of Educational Psychology, 5:222-230, March, 1936.

with poor reading at the age levels considered in this study.5

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> Conditions of muscle imbalance and misprojecting of vision, in addition to a lack of fusion, . . . account for many reading disabilities, and are not responsible for any general mental disability. The lack of visual fusion is due to muscle imbalance that has existed from birth or early infancy.[7]

Witty and Kopel[8] investigated the relationship between visual defects and reading disability. Their experimental group consisted of the one hundred poorest readers in grades three to six, inclusive, of the Evanston, Illinois, public schools. A control group was selected from the same grades and schools. All children were examined for eye con-

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[5] Ibid., p. 254.

[6] Charles A. Selzer, "Lateral Dominance and Visual Fusion," (Harvard Monographs in Education, No. 12; Cambridge, Massachusetts: Harvard University Press, 1933), p. 61.

[7] Ibid., p. 115.

[8] Paul A. Witty and David Kopel, "Heterophoria and Reading Disability," Journal of Educational Psychology, 27:222-230, March, 1936.

dition with the Betts visual tests. An analysis of the data led to the following conclusions:

> The cause of reading disability (as an entity) lies in no single visual factor. Every visual (defect) item considered seems to play a relatively negligible role in the attainment of good and poor readers. Nevertheless, normal vision is indubitably essential to maximum attainment. Therefore it is highly desireable that each child, upon entrance to school and at regular intervals thereafter, should receive thorough ophthalmological study. When this attention is not available, the teacher, nurse, or school psychologist will find appratus such as the Keystone Ophthalmic Telebinocular helpful in isolating quickly many serious visual defects. In every case of reading disability search should be made for visual difficulties. Such information is a vital item in the comprehensive individual diagnosis which should precede remedial endeavor.[9]

Fendrick[10] paired sixty-four poor readers with an equal number of good readers in grades two and three of the New York City schools and tested them for eye condition with the Betts apparatus. The results revealed a lack of relationship between ocular anomalies or deficiencies and the degree of reading disability, except where teaching methods rely preponderantly upon visual techniques. Since most systems for teaching beginning reading stress the ability to make visual discrimination between word forms, Fendrick's conclusion that there is a relationship between eye condition and

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[9] Ibid., p. 230.

[10] Paul Fendrick, "Visual Characteristics of Poor Readers," (Teachers College Contributions to Education, No. 656 New York: Bureau of Publications, Teachers College, Columbia University, 1935), 54 pp.

success in reading where teaching methods rely preponderantly upon visual techniques is significant.

Smith and Jensen[11] state that the investigation of the vision of school children began some years ago, but that only recently a movement has been started to make this work usable in determining reading readiness, and that the Betts Ready to Read Tests should have real value in the determination of reading readiness.

Dean[12] states that lack of visual efficiency may be a serious drawback to children in their school work. He found that 10 to 22 per cent of first grade entrants had defective vision, but that, according to present evidence, nervous instability, restlessness, headaches, and other results of visual deficiency do not impair reading effeciency at the first grade level to the extent that prediction of success or failure can be based on the absence or presence of visual defects.

II. SUMMARY

An analysis of the investigations reviewed in this

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[11] Charles A. Smith and Myrtle R. Jensen, "Educational, Psychological, and Physiological Factors in Reading Readiness, II," Elementary School Journal, 36:683-691, May, 1936.

[12] Charles D. Dean, "Predicting First Grade Reading Achievement," Elementary School Journal, 39:609-616, April, 1939.

chapter reveals contradictory findings regarding the relationship between vision and success in learning to read, both in the light of results and the techniques used to obtain these results. Typical of the two points of view most commonly held are the studies described below.

Wagner,[13] after using the Betts Ready to Read Tests to examine 850 children in grades kindergarten to six, inclusive, of the Syracuse, New York, public schools during the last month of the school year concluded that the differences in visual functioning between good and poor readers were small, and in some cases, perhaps, due to chance.

On the other side Selzer,[14] after constructing stereoscopic tests for studying lateral eye balance and distance fusion, and examining thirty-three poor readers and one hundred unselected school children, concluded that conditions of muscle imbalance and alternating vision, in addition to a lack of distance fusion, accounts for such reading disabilities as are not accounted for by general mental disability.

These investigations reveal an interest in the physical phenomena of vision on the part of research workers

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[13] Wagner, op. cit., p. 146.

[14] Selzer, op. cit., p. 119.

and a definite need for additional investigations and experiments, which will produce evidence for the determination of proper standards in the field of vision.

CHAPTER III

THE CONDUCTION OF THE INVESTIGATION

A normal public school population of beginning first grade pupils was selected for this investigation. This group presented within itself all the variations which might be common to any given public school situation. Special care was used to preserve the ordinary plan of grouping pupils and the usual methods of instruction practiced in first grade public school classrooms, by urging that all teachers concerned follow their customary routine of classroom procedures.

I. SELECTION OF CASES

In selecting the 167 cases used in this investigation, only those pupils were included who (1) were beginning first grade pupils regularly enrolled in the Hobbs, New Mexico, public schools during the 1937-1938 term of school; (2) had no previous public school experience; and (3) were actually in attendance when all tests, including both group and individual prognostic and achievement tests, were administered.

II. TESTING PROCEDURE

The prognostic tests used in this study were given in September, 1937. The achievement measures were administered

eight months later to the same pupils in May, 1938.

All group tests were administered by the writer. With the exception of the teacher's rating, all individual tests were given by the investigator and two assistants, each using the same prearranged procedure.

III. BETTS READY TO READ TESTS

Three different batteries of Betts Ready to Read Tests were used in this investigation. First, the Visual Sensation and Perception Tests, which in reality are twelve individual tests, were used as tests of important binocular functions of the eyes. Second, the Word Form and Auditory Span Tests, which are the basic tests of Betts Visual and Auditory Readiness Tests, were used as reading readiness tests. And third, the Oculmotor and Perception Habits Test, Level One, which is designed to measure the individual pupil's habits of word perception and two-eyed reading tendencies as he views the test through the lens system of the Keystone Ophthalmic Telebinocular,[15] was used as a measure of reading achievement.

The Visual Sensation and Perception Tests were administered in September, 1937 for the purpose of determining

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[15] Emmett Albert Betts, The Prevention and Correction of Reading Disabilities (Evanston, Illinois: Row, Peterson and Company, 1936), pp. 162-163.

the value of these vision tests as prognostic tests of reading achievement.

In addition to the various other tests by other authors, the Betts Word Form and Auditory Span Tests of reading readiness were administered in September, 1937.

The Oculmotor and Perception Habits Test, Level One, was given in May, 1938, as an achievement measure for the purpose of determining the correlation between the factors of binocular vision as measured by the Visual Sensation and Perceptions Tests, and this telebinocular test of the efficiency of the eyes in letter, number, and word recognition skills.

IV. OTHER PROGNOSTIC AND ACHIEVEMENT MEASURES USED IN THIS STUDY

For the purpose of comparing the prognostic usefulness of the Visual Sensation and Perception Tests of the Betts Ready to Read Tests with the predictive values of certain commonly used devices for determining reading readiness, (1) Monroe's Reading Aptitude Test, (2) the Metropolitan Readiness Test, (3) Pressey's Primary Classification Test, and (4) Pintner-Cunningham's Primary Mental Test were included in this study as standardized reading readiness tests.

A teacher's rating scale of first grade pupils is

a predictive measure used by all teachers either consciously or unconsciously. Consequently, the writer felt that this investigation would be incomplete without correlating the teacher's rating of the reading readiness of her pupils with reading achievement at the end of the year.

The teacher's rating scale[16] used in this study was co-operatively constructed by the investigator and the six first grade teachers employed in the Hobbs public schools during the 1937-1938 term of school, and used in September, 1937, by the teachers as an objective standard of reference for rating all first grade pupils considered in this study.

Another measuring device used by all teachers to indicate school success or failure is the teacher's marks recorded on the report card. Hence, in keeping with an attempt to make this investigation of as much practical worth as possible, teachers' marks[17] were correlated with each prognostic measure.

Teachers' marks and teachers' rating of first grade pupils were converted into scores by arbitrarily allowing five points for an excellent rating, four points for a good rating, three points for an average rating, two points for a poor rating, and one point for rating of failure on

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[16] Cf. post, p. 60, Appendix B.

[17] Cf. post, p. 61, Appendix B.

each item so rated. The teacher's rating of first grade pupils contained five separate items, teacher's marks in general scholarship twenty-one items, and teacher's marks in reading scholarship four items.

V. STATISTICAL PROCEDURES

The Bi-Serial Correlation Method[18] was used for finding the correlations between each of the Visual Sensation and Perception Tests of the Betts Ready to Read Tests and the achievement measures used in this study. The pupil's response on each of these tests was simply indicated as passing or failing according to the standards recommended by Betts.[19] Hence, the method of correlation used is identical with that used for correlating the responses a class makes on a certain item of a true false test with their total scores on the same test. This method was not only easier to handle statistically but was perhaps more accurate than the Pearson Product-Moment Method of Correlation[20] would have been, because no assumed means were used.

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[18] Henry E. Garrett, Statistics in Psychology and Education (New York: Longmans, Green and Company, 1938), p. 367.

[19] Betts, op. cit., pp. 323-350.

[20] Harry A. Greene, Workbook in Educational Measurements: Form B (New York: Longmans, Green and Company, 1936), pp. 76-84.

VI. SUMMARY

An unselected public school population of 167 beginning first grade pupils was given the Visual Sensation and Perception Tests of the factors of binocular vision for the purpose of determining the importance of each of these tests as predictive measures of future success in learning to read.

Other predictive measures, including Betts Word Form and Auditory Span Tests, Pressey's Primary Classification Test, the Pintner-Cunningham Primary Mental Test, the Metropolitan Readiness Test, Monroe's reading Aptitude Test, teachers' rating of first grade pupils, and chronological age, were correlated with reading achievement for the purpose of comparison with the Visual Sensation and Perception Tests as to their relative values as reading readiness tests.

The responses to each of the twelve Visual Sensation and Perception Tests were simply classified as passing or failing and correlated with reading achievement by the bi-serial correlation method. The raw scores[21] of the other predictive measures mentioned above were correlated with reading achievement by the Pearson Product-Moment Correlation Method.

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[21] Cf. post, p. 58, Appendix A.

The Detroit Word Test, the Betts Oculmotor and Perception Habits Test, Level One, the Metropolitan Achievement Test, Form A, teachers' marks in general scholarship, the Metropolitan Reading Test, Form A, and teachers' marks in reading scholarship were used as measures of reading achievement or success in learning to read.

CHAPTER IV

THE FACTORS OF BINOCULAR VISION IN READING READINESS

Betts[22] states that all tests of the Visual Sensation and Perception Tests of Betts Ready to Read Tests are devised to appraise the binocular or co-ordinate action of the eyes under conditions simulating the reading process by (1) appraising the binocular co-ordination efficiency of the eyes under such working conditions as reading distance and blackboard distance, (2) testing each eye independently while both eyes are seeing as habitually, and (3) determining two-eyed visual efficiency as well as the acuity of each eye.

The purpose of this chapter is briefly to describe each of the twelve Visual Sensation and Perception Tests, to present the question each test is designed to answer, to outline the nature of a successful response in each case, to summarize the responses made by the 167 first grade pupils to the tests, and to show the bi-serial correlation of each of the tests with reading achievement.

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[22] Emmett Albert Betts, The Prevention and Correction of Reading Difficulties (Evanston, Illinois: Row, Peterson and Company, 1936), pp. 163-164 and 323-350.

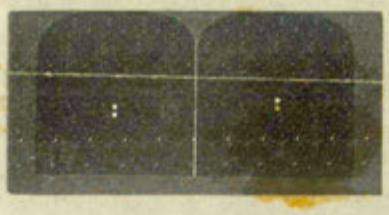
I. DOES BINOCULAR VISION EXIST?

In this first test the above picture is viewed through the lens system of the Keystone Ophthalmic Telebinocular. It is designed to secure the immediate interest of the child in the tests and to enable the examiner to detect one-eyed vision.

Normal response. The dog should be seen jumping through the hoop.

Results. All the pupils passed this test, none failed. Consequently no correlations were calculated between the responses on this test and the achievement measures.

II. IS FUSION NORMAL AT BLACKBOARD DISTANCE?



The purpose of this test is to appraise the individual's

fusion power for isolated letter-size images at blackboard distance.

Normal performance. Normal eyes will quickly fuse the four balls into three.

Results. Sixty-two passed, 105 failed, and the bi-serial correlation with the various achievement measures were as follows:

Detroit Word Test	Bis_r	.117
Oculmotor and Perception Habits Test, Level one	Bis_r	.093
Metropolitan General Achievement Test	Bis_r	.063
Teachers' Marks, General Scholarship	Bis_r	.099
Metropolitan Reading Achievement Test	Bis_r	.097
Teachers' Marks, Reading Scholarship	Bis_r	.080

III. ARE BOTH EYES EFFICIENT, WORKING TOGETHER?

This is a test of the visual efficiency of both eyes.

Normal performance. Dots appear in each of the signs

before each eye and normally are fused into one dot for each sign. The score increases as the pupil successfully responds as increasingly smaller signs are presented. A score of 100 per cent is considered normal or passing.

Results. One hundred forty-eight made a normal response, nineteen failed, and the bi-serial correlations were as follows:

Detroit Word Test	Bis_r	.201
Oculmotor and Perception Habits Test, Level One	Bis_r	.154
Metropolitan General Achievement Test	Bis_r	.126
Teachers' Marks, General Scholarship	Bis_r	.232
Metropolitan Reading Achievement Test	Bis_r	.152
Teachers' Marks, Reading Scholarship	Bis_r	.184

IV. IS THE LEFT EYE EFFICIENT, BOTH EYES WORKING TOGETHER?

The purpose of this test is to test the sharpness of the vision of the left eye.

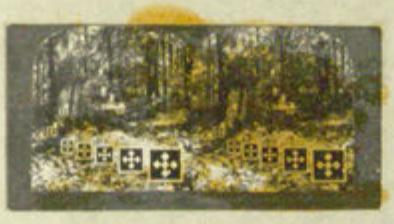
Normal performance. There are no dots in the signs before the right eye; therefore, the visual efficiency of the left eye is checked while both eyes are seeing as habitually. The score increases as the pupil successfully responds as increasingly smaller signs are presented. A score of ninety per cent or above is considered normal.

Results. One hundred twenty-six passed this test, forty one failed, and the bi-serial correlations with the six achievement devices used in this investigation were as follows:

Detroit Word Test	Bis_r	.175
Oculmotor and Perception Habits Test, Level one	Bis_r	.129
Metropolitan General Achievement Test	Bis_r	.174
Teachers' Marks, General Scholarship	Bis_r	.185
Metropolitan Reading Achievement Test	Bis_r	.137
Teachers' Marks, Reading Scholarship	Bis_r	.132

V. IS THE RIGHT EYE EFFICIENT,

BOTH EYES WORKING TOGETHER?



The purpose of this test is to check the sharpness

of the vision of the right eye while the left eye is seeing also.

Normal performance. There are no dots in the signs before the left eye; therefore, the visual efficiency of the right eye is checked while the left eye is also seeing. The score increases as the pupil successfully responds as increasingly smaller signs are presented. A score of ninety per cent or above is considered passing.

Results. One hundred fifty three tested normal, fourteen failed, and the bi-serial correlations were as follows:

Detroit Word Test	Bis_r	.111
Oculmotor and Perception Habits Test, Level one	Bis_r	.116
Metropolitan General Achievement Test	Bis_r	.090
Teachers' Marks, General Scholarship	Bis_r	.163
Metropolitan Reading Achievement Test	Bis_r	.094
Teachers' Marks, Reading Scholarship	Bis_r	.165

VI. ARE THE EYES BALANCED VERTICALLY?

This test is designed to determine whether or not the

the eyes function in the same horizontal plane.

Normal performance. If the individual sees the line superimposed upon any part of the ball, his response is considered normal.

Results. One hundred sixty-six passed this test, and only one failed. Consequently, no bi-serial correlations were figured for this test.

VII. HAS DEPTH PERCEPTION BEEN DEVELOPED?

The purpose of this test is to measure the individual's eye co-ordination power.

Normal performance. One of the five figures in each row stands out apparently nearer to the person being examined than do any of the other four figures. The score is the per cent of eye co-ordination for the last row of figures read promptly and correctly. A score of 100 per cent is considered normal.

Results. Only thirty-seven tested normal, and 140 failed. The bi-serial correlations with achievement were as follows:

the eye function in the same horizontal plane.

Normal performance. If the individual made one line superimposed upon any part of the test, his response is considered normal.

Results. One hundred sixty-six normal girls took the test, and only one failed. Consequently, no bi-aural comparisons were figured for this test.

VII. ARE THE PERCEPTION TIME SYSTEMS

The purpose of this test is to measure the individual's eye co-ordination power.

Normal performance. One of the five figures in each row stands out apparently nearer to the person being examined than do any of the other four figures. The amount of the percent of eye co-ordination for the just one of figures read promptly and correctly. A score of 100 per cent is considered normal.

Results. Only sixty-seven became normal, and 100 failed. The bi-aural correlations with achievement were as follows:

Detroit Word Test	Bis_r	.218
Oculmotor and Perception Habits Test, Level one	Bis_r	.163
Metropolitan General Achievement Test	Bis_r	.209
Teachers' Marks, General Scholarship	Bis_r	.287
Metropolitan Reading Achievement Test	Bis_r	.167
Teachers' Marks, Reading Scholarship	Bis_r	.265

VIII. IS LATERAL EYE BALANCE AT DISTANCE NORMAL?

The purpose of this test is to determine the tendency of the eyes to turn in or out or to remain normally parallel for blackboard distance seeing.

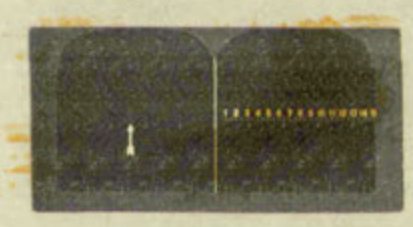
Normal performance. The range of tolerance is to see the pointer somewhere from 7 to 11 inclusive.

Results. One hundred forty-four successfully passed this test, twenty-three failed, and the bi-serial correlations with achievement were as follows:

Detroit Word Test	Bis_r	.080

Oculmotor and Perception Habits Test, Level one	Bis_r	.067
Metropolitan General Achievement Test	Bis_r	.002
Teachers' Marks, General Scholarship	Bis_r	.035
Metropolitan Reading Achievement Test	Bis_r	.030
Teachers' Marks, Reading Scholarship	Bis_r	.044

IX. IS LATERAL EYE BALANCE AT READING DISTANCE NORMAL?



This test is the same as Test VIII except that the slide holder is set at reading distance for this test and at blackboard distance for Test VIII. Its purpose is to determine the tendency of the eyes to turn in or out or to remain normally parallel for reading distance seeing.

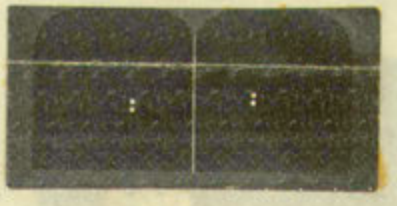
Normal performance. The range of tolerance for seeing the pointer is anywhere from 3 to 6½ inclusive.

Results. One hundred sixty-one successfully passed this test, while only six failed. The bi-serial correla-

tions were as follows:

Detroit Word Test	Bis_r	-.059
Oculmotor and Perception Habits Test, Level one	Bis_r	-.092
Metropolitan General Achievement Test	Bis_r	-.107
Teachers' Marks, General Scholarship	Bis_r	-.023
Metropolitan Reading Achievement Test	Bis_r	-.117
Teachers' Marks, Reading Scholarship	Bis_r	-.091

X. IS FUSION NORMAL AT READING DISTANCE?



This test provides an index to the individual's fusion ability at reading distance and is not to be confused with Test II, which is used to appraise the individual's fusion power for isolated letter size images.

Normal performance. Normal fusion at reading distance will fuse the four balls into three instantly.

Results. One hundred twelve possessed normal fusion at reading distance, fifty-five did not, and the bi-serial

correlations with achievement were as follows:

Detroit Word Test	Bis_r	.112
Oculmotor and Perception Habits Test, Level one	Bis_r	.090
Metropolitan General Achievement Test	Bis_r	.085
Teachers' Marks, General Scholarship	Bis_r	.096
Metropolitan Reading Achievement Test	Bis_r	.087
Teachers' Marks, Reading Scholarship	Bis_r	.212

XI. IS THERE MINIMUM ACUITY FOR FINE PRINT AT READING DISTANCE?

This test is used to detect errors of focus caused by farsightedness, nearsightedness, and astigmatism which interfere with efficient vision at reading distance.

Normal performance. The subject should see three lines in each of the test balls, A, D, and E for the left eye, and test balls 1, 4, and 5 for the right eye.

Results. One hundred sixteen passed this test, fifty-

one failed, and the bi-serial correlations were as follows:

Detroit Word Test	Bis_r	.165
Oculmotor and Perception Habits Test, Level one	Bis_r	.235
Metropolitan General Achievement Test	Bis_r	.213
Teachers' Marks, General Scholarship	Bis_r	.268
Metropolitan Reading Achievement Test	Bis_r	.216
Teachers' Marks, Reading Scholarship	Bis_r	.247

XII. IS THERE MINIMUM SHARPNESS OF IMAGE AT DISTANCE?

This test is used to detect errors of focus caused by farsightedness, nearsightedness, and astigmatism which interfere with efficient vision at blackboard distance.

Normal performance. The subject should see three lines in each of the test balls B, C, and F for the left eye, and test balls 2, 3, and 6 for the right eye.

Results. One hundred five made normal responses,

sixty-two failed, and the bi-serial correlations with achievement were as follows:

Detroit Word Test	Bis_r	.114
Oculmotor and Perception Habits Test, Level one	Bis_r	.135
Metropolitan General Achievement Test	Bis_r	.152
Teachers' Marks, General Scholarship	Bis_r	.255
Metropolitan Reading Achievement Test	Bis_r	.156
Teachers' Marks, Reading Scholarship	Bis_r	.236

XIII. SUMMARY

The purpose of this chapter was to determine the correlation between reading achievement and the factors of binocular vision as measured by the Visual Sensation and Perception Tests of the Betts tests. The question presented by Test I, Does binocular vision exist? was answered in the affirmative, as all of the 167 cases were found to possess two-eyed vision. Consequently, this test was not correlated with reading achievement.

The correlation of blackboard distance fusion with reading achievement ranged from .063 with the Metropolitan Achievement Test to .117 with the Detroit Word Test.

The efficiency of both eyes correlated from .126 with the Metropolitan Achievement Test to .232 with teachers'

sixty-two failed, and the bi-serial correlations with achievement were as follows:

Detroit Word Test	Bis_r	.115
Gwinnator and Perception Habits Test, Level one	Bis_r	.150
Metropolitan General Achievement Test	Bis_r	.127
Teachers' Marks, General Scholarship	Bis_r	.000
Metropolitan Reading Achievement Test	Bis_r	.06
Teachers' Marks, Reading Scholarship	Bis_r	.08

XIII. SUMMARY

The purpose of this chapter was to determine the correlation between reading achievement and the factors of binocular vision as measured by the Visual Coordination and Perception Tests of the Betts Tests. The question presented by Test I, Does binocular vision exist, was answered in the affirmative, as all of the 107 cases were found to possess two-eyed vision. Consequently, this test was not correlated with reading achievement.

The correlation of blackboard distance focus with reading achievement ranged from .065 with the Metropolitan Achievement Test to .117 with the Detroit Word Test.

The efficiency of both eyes correlated from .128 with the Metropolitan Achievement Test to .252 with teachers'

marks in general scholarship, the left eye from .129 with Betts Oculmotor and Perception Habits Test, Level One, to .185 with teachers' marks in general scholarship, and the right eye from .090 with the Metropolitan Achievement Test to .165 with teachers' marks in reading scholarship.

Only one child was found to have vertically imbalanced eyes. Consequently no correlations were made between this test and reading achievement.

The correlation between depth perception or coordination level and reading achievement ranged from .167 with Betts Oculmotor and Perception Habits Test, Level One, to .287 with teachers' marks in general scholarship.

The correlation between reading achievement and lateral eye balance ranged from -.023 with teachers' marks in general scholarship to -.117 with the Metropolitan Reading Test.

Reading distance fusion correlated with reading achievement from .085 with the Metropolitan Achievement Test to .212 with teachers' marks in reading scholarship.

The correlation between reading achievement and minimum acuity for fine print ranged from .165 with the Detroit Word Test to .268 with teachers' marks in general scholarship, while sharpness of image at blackboard distance ranged from .114 with the Detroit Word Test to .255 with teachers' marks in general scholarship.

CHAPTER V

OTHER PROGNOSTIC TESTS USED IN THIS STUDY

Since the value of the Betts vision tests as predictive measures of reading achievement have by the data thus far presented been found open to serious question, the writer felt that if other tests or devices more simple and less expensive were found to be just as effective as the Betts tests, such information would have definite practical value for first grade teachers. Consequently, the writer felt justified in including other group and individual tests of reading readiness in this study.

I. BETTS WORD FORM TEST[23]

The purpose of this test is to determine reading readiness by analyzing the individual's ability to discriminate rapidly between (1) long and short words; (2) variations within words having like beginnings and endings; (3) words subject to total reversals; and (4) words, parts of which are subject to reversals.

The Betts Word Form Test was given in September, 1937, and its raw score correlations with reading achievement were as follows:

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[23] Betts, op. cit., pp. 314-316.

Detroit Word Test	r	.478 ± .040
Oculmotor and Perception Habits Test, Level one	r	.384 ± .042
Metropolitan General Achievement Test	r	.397 ± .041
Teachers' Marks, General Scholarship	r	.281 ± .044
Metropolitan Reading Achievement Test	r	.436 ± .041
Teachers' Marks, Reading Scholarship	r	.374 ± .042

II. BETTS AUDITORY SPAN TEST[24]

This test is designed to indicate the tendency of the subject to confuse and reverse letter and word-sounds heard spoken by others.

The Betts Auditory Span Test was also given in September, 1937, and its raw scores were correlated with reading achievement with the following results:

Detroit Word Test	r	.382 ± .042
Oculmotor and Perception Habits Test, Level one	r	.215 ± .048
Metropolitan General Achievement Test	r	.413 ± .041
Teachers' Marks, General Scholarship	r	.293 ± .044
Metropolitan Reading Achievement Test	r	.376 ± .042

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[24] Betts, op. cit., pp. 318-319.

Teachers' Marks, Reading Scholarship	r	.348 ± .043

III. PRESSEY'S PRIMARY CLASSIFICATION TEST

This test is designed to appraise certain skills or abilities necessary to do first grade work, such as the individual's ability to (1) take directions, (2) classify objects, (3) dot patterns, and (4) locate absurdities.

Pressey's Primary Classification Test was given in September, 1937, and its correlations with reading achievement based on raw scores were as follows:

Detroit Word Test	r	.611 ± .033
Oculmotor and Perception Habits Test, Level one	r	.404 ± .041
Metropolitan General Achievement Test	r	.523 ± .037
Teachers' Marks, General Scholarship	r	.303 ± .044
Metropolitan Reading Achievement Test	r	.523 ± .037
Teachers' Marks, Reading Scholarship	r	.409 ± .041

IV. PINTNER-CUNNINGHAN PRIMARY MENTAL TEST

The purpose of this test, rather widely used with kindergarten, first, and second grade children, is to measure the mental ability of the child through the responses he makes to tests of (1) common observation, (2) aesthetic

Teachers' Marks, Reading
Scholarship

III. PRESS'S PRIMARY MENTAL ABILITY TEST

This test is designed to measure certain mental abilities necessary to do first grade work, such as the individual's ability to (1) take directions, (2) [illegible] objects, (3) [illegible] patterns, and (4) [illegible].

Teacher's Primary Diagnostic Test [illegible] September, 1927, and the [illegible] ment based on two [illegible] work [illegible].

Detroit Word Test

Dominator and Paragraph Meaning Test, Level One

Metropolitan General Achievement Test

Teachers' Marks, General Scholarship

Metropolitan Reading Achievement Test

Teachers' Marks, Reading Scholarship

IV. INTRA-CURRICULAR [illegible]

The purpose of this test [illegible] Kindergarten, first, and second [illegible] the mental ability of the child [illegible] makes to tests or (1) [illegible]

differences, (3) associated objects, (4) size discrimination, (5) picture parts, and (6) picture completion.

The Pintner-Cunningham Primary Mental Test was also given in September, 1937, and the correlations of the raw scores made on this test with those made on the reading achievement measures were as follows:

Detroit Word Test	r	.597 ± .034
Oculmotor and Perception Habits Test, Level one	r	.313 ± .044
Metropolitan General Achievement Test	r	.543 ± .035
Teachers' Marks, General Scholarship	r	.318 ± .044
Metropolitan Reading Achievement Test	r	.517 ± .038
Teachers' Marks, Reading Scholarship	r	.438 ± .041

V. METROPOLITAN READINESS TEST

This test is a battery of six tests designed to indicate the subject's readiness for reading through an analysis of his responses to a total of 124 items. The pictorial method is applied to all the tests in this battery.

The Metropolitan Readiness Test was administered in September, 1937, and the correlations between the raw scores on this test and those made on the six tests or devices used for measuring success in learning to read were as follows:

Detroit Word Test	r	.683 ± .028

Oculmotor and Perception Habits Test, Level one	r	.507 ± .037
Metropolitan General Achievement Test	r	.642 ± .031
Teachers' Marks, General Scholarship	r	.402 ± .041
Metropolitan Reading Achievement Test	r	.619 ± .032
Teachers' Marks, Reading Scholarship	r	.504 ± .039

VI. MONROE'S READING APTITUDE TEST

This battery of tests consists of both group and individual items, and is designed to measure those aptitudes most essential to success in learning to read, namely, visual, auditory, motor, articulation, and language aptitudes.

Monroe's Reading Aptitude Test was administered in September, 1937, and the total raw scores made on the five aptitude tests included in this battery of tests correlated with reading achievement as follows:

Detroit Word Test	r	.481 ± .040
Oculmotor and Perception Habits Test, Level one	r	.440 ± .041
Metropolitan General Achievement Test	r	.557 ± .035
Teachers' Marks, General Scholarship	r	.556 ± .035
Metropolitan Reading Achievement Test	r	.291 ± .044
Teachers' Marks, Reading Scholarship	r	.576 ± .034

VI. TEACHER'S RATING OF FIRST GRADE PUPILS

This rating scale was devised for the purpose of obtaining the objective opinion of classroom teachers of each pupil's readiness for reading in terms of ability to learn, emotional stability, social adjustment, and personal habits of initiative and industry. This is an adaptation of an idea used by Wright[25] in his prognostic study of reading readiness.

The correlations between teacher predictions and actual achievements were as follows:

Detroit Word Test	r	.391 ± .042
Oculmotor and Perception Habits Test, Level one	r	.418 ± .041
Metropolitan General Achievement Test	r	.397 ± .042
Teachers' Marks, General Scholarship	r	.542 ± .035
Metropolitan Reading Achievement Test	r	.409 ± .041
Teachers' Marks, Reading Scholarship	r	.504 ± .039

VIII. CHRONOLOGICAL AGE IN MONTHS

The correlations between chronological age and success

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[25] Wendell William Wright, Reading Readiness-- A Prognostic Study (Bulletin of School of Education, Vol. 12 No. 3, Bloomington, Indiana: Indiana University, 1936), p. 8.

VI. TEACHER'S RATING OF FIRST GRADE PUPILS

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The correlations between teacher predictions and actual achievements were as follows:

Detroit Word Test	r	.391 ± .062
Gunimotor and Perception Habits Test, Level one	r	.415 ± .061
Metropolitan General Achievement Test	r	.397 ± .062
Teachers' Marks, General Scholarship	r	.542 ± .058
Metropolitan Reading Achievement Test	r	.409 ± .061
Teachers' Marks, Reading Scholarship	r	.604 ± .059

VIII. CHRONOLOGICAL AGE IN MONTHS

The correlations between chronological age and success

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[26] Wendell William Wright, Reading Readiness-- A Prognostic Study (Bulletin of School of Education, Vol. 12 No. 3, Bloomington, Indiana: Indiana University, 1936), p. 8.

in reading as indicated by academic achievement were as follows:

Detroit Word Test	r	.106 ± .050
Oculmotor and Perception Habits Test, Level one	r.	-.033 ± .052
Metropolitan General Achievement Test	r	.028 ± .052
Teachers' Marks, General Scholarship	r	-.158 ± .047
Metropolitan Reading Achievement Test	r	.038 ± .052
Teachers' Marks, Reading Scholarship	r	-.108 ± .050

IX. SUMMARY

From the standpoint of median correlations the three best predictive instruments were found to be: (1) The Metropolitan Readiness Test with a median correlation of .563 ranged from .402 ± .041 with teacher's marks in general scholarship to .683 ± .028 with the Detroit Word Test. (2) The Monroe Reading Aptitude Test with a median correlation of .519 ranged from .291 ± .044 with the Metropolitan reading Test to .576 ± .034 with teacher's marks in reading scholarship. (3) The Pintner-Cunningham Primary Mental Test with a median correlation of .478 ranged from .313 ± .044 with Betts Oculmotor Perception Habits Test, Level One, to .597 ± .034 with the Detroit Word Test.

In reading as indicated by standard achievement tests we have

follows:

Detroit Word Test	r = .038 ± .030
Gaulmaster and Ferguson Battle Test, Level One	r = .000 ± .000
Metropolitan General Achievement Test	r = .000 ± .000
Teachers' Marks, General Scholarship	r = .105 ± .000
Metropolitan Reading Achievement Test	r = .000 ± .000
Teachers' Marks, Reading Scholarship	r = .106 ± .000

II. SUMMARY

From the standpoint of reading correlations the three best predictive instruments were found to be (1) the Metropolitan Reading Test with a median correlation of .105 ranged from .025 ± .000 with Gaulmaster's Test of Reading Scholarship to .000 ± .000 with the Detroit Word Test. (2) The Monroe Reading Aptitude Test with a median correlation of .025 ranged from .021 ± .044 with the Metropolitan Reading Test to .079 ± .000 with Gaulmaster's Marks in Reading Scholarship. (3) The Pinner-Cunningham Primary Mental Test with a median correlation of .024 ranged from .023 ± .000 with Rotha Gaulmaster Ferguson Battle Test, Level One, to .027 ± .000 with the Detroit Word Test.

Pressey's Primary Classification Test ranked fourth as a predictive measure, with a median correlation of .466 which ranged from .303 ± .044 with teachers' marks in general scholarship to .611 ± .033 with the Detroit Word Test.

The teacher's rating of first grade pupils ranked next, with a median correlation of .414 which ranged from .391 ± .041 with the Detroit Word Test to .542 ± .035 with teachers' marks in general scholarship. It ranked ahead of both the Betts Word Form Test and the Betts Auditory Span Test as an instrument for predicting future success in learning to read.

The Betts Word Form Test had a median correlation of .391 with reading achievement, ranging from .281 ± .044 with teachers' marks in general scholarship to .478 ± .040 with the Detroit Word Test. The Betts Auditory Span Test had a median correlation of .362 ranging from .215 ± .048 with Betts Oculmotor and Perception Habits Test, Level One, to .413 ± .041 with the Metropolitan Achievement Test.

The lowest degrees of correlation between any prognostic test and reading achievement were those between chronological age and reading achievement. Chronological age had a median correlation of -.072 ranging from .028 ± .052 with the Metropolitan Achievement Test to -.158 ± .047 with teachers' marks in general scholarship.

Fressey's Primary Diagnostic Test varied from as a predictive measure, with a median correlation of .425 which ranged from .302 ± .061 with teachers' marks in general scholarship to .411 ± .055 with the Detroit Word Test.

The teacher's-rating or first grade pupil's reading mark, with a median correlation of .414 which ranged from .391 ± .041 with the Detroit Word Test to .047 ± .098 with teachers' marks in general scholarship. The median order of both the Gates Word Form Test and the Gates Analytic Word Test as an instrument for predicting future success in learning to read.

The Binet Mental Age had a median correlation of .391 with reading achievement, ranging from .41 ± .04 with teachers' marks in general scholarship to .414 ± .055 with the Detroit Word Test. The Gates Auditory Word Test had a median correlation of .384 ranging from .411 ± .04 with Betts Oculomotor and Perception Profile Test, level 6, to .412 ± .041 with the Metropolitan Achievement Test.

The lowest degrees of correlation between age-grade, mental age and reading achievement were those between chronological age and reading achievement. Chronological age had a median correlation of .302 ranging from .325 ± .055 with the Metropolitan Achievement Test to .184 ± .047 with teachers' marks in general school rank.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purposes of this investigation were (1) to determine the predictive values of the factors of binocular vision in reading readiness, as measured by the Visual Sensation and Perception Tests of Betts Ready to Read Tests, and (2) to compare the relative values of the Betts tests as measures of probable future success in reading with those of other group and individual standardized and non-standardized prognostic tests.

I. PROCEDURE

One hundred sixty-seven beginning first grade pupils enrolled in six regular classrooms of the Hobbs, New Mexico, public schools during the 1937-1938 term of school were given prognostic tests in September, 1937, and achievement tests eight months later in May, 1938, in an attempt to compare the usefulness of the Betts Ready to Read Tests with other devices for predicting success or failure in learning to read.

II. THE FACTORS OF BINOCULAR VISION IN READING READINESS

Table I gives a summary of the number who passed

TABLE I

RECORD OF 167 PUPILS ON THE BETTS
VISUAL SENSATION AND PERCEPTION TESTS

Test	Purpose	Number passing	Number failing
1.	Does binocular vision exist?	167	0
2.	Is fusion normal at blackboard distance?	62	105
3.	Are both eyes efficient, working together?	148	19
4.	Is the left eye efficient, both eyes working together?	126	41
5.	Is the right eye efficient, both eyes working together?	153	14
6.	Are the eyes balanced vertically?	166	1
7.	Has depth perception been developed?	37	140
8.	Is lateral eye balance at blackboard distance normal?	144	23
9.	Is lateral eye balance at reading distance normal?	161	6
10.	Is fusion normal at reading distance?	112	55
11.	Is there minimum acuity for fine print at reading distance?	116	51
12.	Is there minimum sharpness of image at blackboard distance?	105	62

TABLE I

RECORD OF 167 PUPILS ON THE BETTS
VISUAL SENSATION AND PERCEPTION TESTS

Test	Purpose	Number passing	Number Failing
1.	Does binocular vision exist?	167	0
2.	Is fusion normal at blackboard distance?	62	105
3.	Are both eyes efficient, working together?	148	19
4.	Is the left eye efficient, both eyes working together?	125	42
5.	Is the right eye efficient, both eyes working together?	153	14
6.	Are the eyes balanced vertically?	166	1
7.	Has depth perception been developed?	27	140
8.	Is lateral eye balance at blackboard distance normal?	144	23
9.	Is lateral eye balance at reading distance normal?	161	6
10.	Is fusion normal at reading distance?	115	52
11.	Is there minimum acuity for fine print at reading distance?	116	51
12.	Is there minimum sharpness of image at blackboard distance?	102	65

each of the twelve Betts Visual Sensation and Perception Tests. It will be noted that in only two of the tests were there more children who failed than passed. One hundred forty cases failed the depth perception test, and 105 the blackboard distance fusion test. It will also be noted that all the children were found to possess two-eyed vision, and that only one child had vertically imbalanced eyes.

Table II gives a summary of the bi-serial correlations found to exist between the Betts Visual Sensation and Perception Tests and each of the six measures of reading achievement used in this study.

With the exception of lateral eye balance at reading distance, which had a negative correlation with reading achievement, all the Betts Visual Sensation and Perception Tests were found to have a positive correlation with reading achievement. However, the degree of correlation was less than .200 for five of the tests, and below .288 for all the tests.

Consequently, the relationship between responses made to the Betts Visual Sensation and Perception Tests and later success in reading, as measured by the six reading achievement measures used in this study, is of little or no significance in the light of the findings of this investigation. That is, the degrees of correlation are entirely too low to

each of the twelve Betts Visual Sensation and Perception Tests. It will be noted that in only two of the tests were there more children who failed than passed. One hundred forty cases failed the depth perception test, and 108 the blackboard distance fusion test. It will also be noted that all the children were found to possess two-eyed vision, and that only one child had vertically imbalanced eyes.

Table II gives a summary of the bi-serial correlations found to exist between the Betts Visual Sensation and Perception Tests and each of the six measures of reading achievement used in this study.

With the exception of lateral eye balance at reading distance, which had a negative correlation with reading achievement, all the Betts Visual Sensation and Perception Tests were found to have a positive correlation with reading achievement. However, the degree of correlation was less than .500 for five of the tests, and below .388 for all the tests.

Consequently, the relationship between responses made to the Betts Visual Sensation and Perception Tests and later success in reading, as measured by the six reading achievement measures used in this study, is of little or no significance in the light of the findings of this investigation. That is, the degrees of correlation are entirely too low to

TABLE II

BI-SERIAL CORRELATIONS BETWEEN THE BETTS VISUAL SENSATION AND PERCEPTION TESTS AND SIX READING ACHIEVEMENT MEASURES

Betts Visual Sensation and Perception Tests	Achievement measures					
	Detroit Word Test	Oculmotor and Perception Habits Test	Metropolitan Achievement Test	Teachers' marks in general scholarship	Metropolitan Reading Test	Teachers' marks in general scholarship
*Does binocular vision exist?						
Is fusion normal at blackboard distance?	.117	.093	.063	.099	.097	.080
Are both eyes efficient, working together?	.201	.154	.126	.232	.152	.184
Is the left eye efficient, both eyes working together?	.175	.129	.174	.185	.137	.132
Is the right eye efficient, both eyes working together?	.111	.116	.090	.163	.094	.165
*Are the eyes balanced vertically?						
Has depth perception been developed?	.218	.163	.209	.287	.167	.265
Is lateral eye balance at blackboard distance normal?	.080	.067	.002	.035	.030	.044
Is lateral eye balance at reading distance normal?	-.059	-.092	-.107	-.073	-.117	-.091
Is fusion normal at reading distance?	.112	.090	.085	.096	.087	.212
Is there minimum acuity for fine print at reading distance?	.165	.235	.213	.268	.216	.247
Is there minimum sharpness of image at blackboard distance?	.114	.135	.152	.255	.156	.236

*This test was not correlated with reading achievement.

indicate that these tests of the factors of binocular vision have any value as reading readiness tests.

III. OTHER PROGNOSTIC TESTS USED IN THIS STUDY

Table III shows the degree of correlation and the probable error of the correlation between the raw scores of each of the eight predictive instruments included in this study for comparison with Betts Visual Sensation and Perception Tests, and the raw scores of each of the six measures of reading achievement.

It will be noted that all the correlations were positive, with the exception of chronological age, which had a slightly negative near-zero correlation with reading achievement. The median correlations of the other seven predictive tests with reading achievements, ranging from .362 for Betts Auditory Span Test to .563 for the Metropolitan Readiness Test, were much higher than the correlations between the Betts Visual Sensation and Perception Tests and reading achievement, which ranged from a near-zero correlation for the eye imbalance tests to a median correlation of only .225 for acuity for fine print at reading distance.

However, the correlations between Betts Word Form and Auditory Span Tests and reading achievement are too low,

TABLE III

PEARSON CORRELATIONS BETWEEN THE RAW SCORES OF EIGHT READING READINESS MEASUREMENTS AND SIX READING ACHIEVEMENT MEASURES

Reading Readiness Tests	Achievement measures					
	Detroit Word Test	Oculmotor and Perception Habits Test, Level one	Metropolitan Achievement Test, Form A	Teachers' marks in general scholarship	Metropolitan Reading Test, Form A	Teachers' marks in general scholarship
Betts Word Form Test	.478±.040	.384±.042	.397±.041	.281±.044	.436±.041	.374±.042
Betts Auditory Span Test	.382±.042	.215±.048	.413±.041	.293±.044	.376±.042	.348±.043
Pressey's Primary Classification Test	.611±.033	.404±.041	.523±.037	.303±.044	.523±.037	.409±.041
Pintner-Cunningham Primary Mental Test	.597±.034	.313±.044	.543±.035	.318±.044	.517±.038	.438±.041
Metropolitan Readiness Test	.683±.028	.507±.037	.642±.031	.402±.041	.619±.032	.504±.039
Monroe's Reading Aptitude Test	.481±.040	.440±.041	.557±.035	.556±.035	.291±.044	.576±.034
Teachers' Rating of First Grade Pupils	.391±.042	.418±.041	.397±.042	.542±.035	.409±.041	.504±.039
Chronological Age in Months	.106±.050	-.033±.052	.028±.052	-.158±.047	.038±.052	-.108±.050

the median correlation being merely .391 for the Word Form Test and .362 for the Auditory Span Test, to justify their usage as tests of reading readiness.

The teachers' rating of first grade pupils, with a median correlation of .414, ranging from .391 ± .041 with the Detroit Word Test to .542 ± .035 with teacher marks in general scholarship, indicates that this device has possibilities as an instrument for predicting probable success in learning to read.

Assuming that each of the six measures of reading achievement was of equal value in measuring success in reading, and by finding the median correlation of each prognostic test with the six achievement measures, the eight prognostic tests were found to rank in descending order as tests of reading readiness as follows:

1. The Metropolitan Readiness Test
2. The Monroe Reading Aptitude Test
3. The Pintner-Cunningham Primary Mental Test
4. Pressey's Primary Classification Test
5. Teacher's rating of first grade pupils
6. Betts Word Form Test
7. Betts Auditory Span Test
8. Chronological age

IV. CONCLUSIONS AND INFERENCES

the median correlation being .801 for the Word Test and .866 for the Auditory Span Test, so that it may be an basis of reading readiness.

The teachers' rating of first grade pupils, and the median correlation of .414, results from .377 for the Letsoit Word Test to .549 for the Auditory Span Test in general scholarship, indicates that the tests are abilities as an instrument for predicting success in learning to read.

Assuming that each of the six mental or reading achievement was of equal value in comparing success in reading, and by finding the median correlation of the prognostic test with the six achievement measures, the eight prognostic tests were found to rank in descending order as tests of reading readiness as follows:

1. The Metropolitan Readiness Test
2. The Monroe Reading Aptitude Test
3. The Pintner-Cunningham Primary Mental Test
4. Freeman's Primary Discrimination Test
5. Teacher's rating of first grade pupils
6. Pates Word Form Test
7. Seashore Auditory Span Test
8. Chronological age

IV. CONCLUSIONS AND IMPLICATIONS

The writer has drawn the following conclusions and inferences from the findings of this investigation:

1. With all the correlations between the Betts Visual Sensation and Perception Tests of the factors of binocular vision and reading achievement being below .288 for all tests, the writer concludes that the Betts Visual Sensation and Perception Tests of the co-ordinate actions of the eyes cannot, therefore, be used as criteria for determining reading readiness.

2. While the median correlation between reading achievement and the vision tests of eye co-ordination or depth perception, visual acuity for fine print, two-eyed visual efficiency, and distance sharpness of image were approximately .200, all the correlations are too low to indicate that any of the Betts Visual Sensation and Perception Tests have any value as predictive measures of success in reading.

3. The near-zero correlations of the eye imbalance tests, both lateral and vertical, with reading achievement were the most insignificant of any of the vision test correlations.

4. The teachers' rating of first grade pupils, with a median correlation of .414 with the six achievement measures, with individual correlations ranging from .391 with the Detroit Word Test to .542 with teacher's marks in

general scholarship, seems to warrant further investigation as to the possibilities of a teacher's rating scale, when used under careful supervision, as a practical, inexpensive test of reading readiness.

5. The median correlation between each prognostic test and the six achievement measures with which it was correlated shows that the Metropolitan Readiness Test with a median correlation of .563, the Monroe Reading Aptitude Test with a median correlation of .519, the Pintner-Cunninghan Primary Mental Test with a median correlation of .478, and Pressey's Primary Classification Test with a median correlation of .466, have the highest correlations with reading achievement of all the predictive instruments used in this study.

6. The median correlation between reading achievement and the Betts Word Form Test was .391, and the median correlation between reading achievement and the Betts Auditory Span Test was .362. These correlations are both so low as to indicate that neither of these individual tests is a valid criterion of reading readiness.

7. The slightly negative, near-zero correlation between chronological age and reading achievement suggests that chronological age is not a valid criterion of reading readiness.

general mechanical, seems to measure further aspects, such as the reliability of a teacher's ratings, when used under general supervision, or by a critical, thoroughgoing test of reading readiness.

5. The median correlation between each primary test and the six achievement measures with which it was correlated above that of the Metropolitan Reading Test is a median correlation of .[illegible], the Binet Reading Test with a median correlation of .[illegible], the Stanford-Binet Primary Mental Test with a median correlation of .[illegible], and Pressey's Primary Diagnostic Test with a median correlation of .[illegible], here the highest correlations with reading achievement of all the tests considered in this study.

6. The median correlation between reading achievement and the Test of Mental Maturity, .[illegible], was the median correlation between reading achievement and the Primary Test, .[illegible]. These correlations seem to indicate that neither of these intelligence tests is a valid criterion of reading readiness.

7. The significant negative, rank-order correlation between chronological age and reading achievement indicates that chronological age is not a valid criterion of reading readiness.

V. RECOMMENDATIONS

The writer makes the following recommendations for further study and investigation:

1. That further study be made of the relation between reading achievement and vision tests of eye co-ordination or depth perception, visual acuity for fine print at reading distance, two-eyed visual efficiency, and sharpness of image at blackboard distance. The present study merely considers each tendency or factor as passing or failing. It is also the opinion of the writer that the tests used for such study would need to be more interesting and better adapted to the age of beginning first grade children and easier to score than the Betts Vision Tests.

2. That the possibilities of the average classroom teacher's ability to rate, under careful supervision, the reading readiness of beginning first grade children be determined through further study and investigation involving a large number of teachers in many different kinds of situations.

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APPENDIX A

TABLE IV

ARITHMETIC MEANS AND STANDARD DEVIATIONS OF RAW SCORES OF PROGNOSTIC MEASURES USED IN THIS INVESTIGATION

Test	Arithmetic Means	Standard Deviations
Betts Word Form Test	18.880	5.180
Betts Auditory Span Test	13.090	4.092
Pressey's Primary Classification Test	26.555	14.215
Pintner-Cunningham's Primary Mental Test	32.826	8.186
Metropolitan Readiness Test	82.994	16.416
Monroe's Reading Aptitude Test	47.305	19.141
Teachers' Rating of First Grade Pupils	16.898	3.864
Chronological Age (C. A.)	76.856	4.897
Mental Age (M. A.)	84.395	10.956
Intelligence Quotient (I. Q.)	108.359	15.296

TABLE V

ARITHMETIC MEANS AND STANDARD DEVIATIONS OF RAW SCORES OF ACHIEVEMENT MEASURES USED IN THIS INVESTIGATION

Test	Arithmetic Means	Standard Deviations
Detroit Word Test	19.419	9.545
Oculmotor and Perception Habits Test, Level one	66.174	24.408
Metropolitan Achievement Test	98.491	30.023
Teachers' Marks, General Scholarship	73.928	11.578
Metropolitan Reading Achievement Test	48.776	19.575
Teachers' Marks, Reading Scholarship	13.832	2.847

TABLE V

ARITHMETIC MEANS AND STANDARD DEVIATIONS OF RAW SCORES

ON ADMINISTRATIVE MEASURES USED IN THIS INVESTIGATION

Test	Arithmetic Means	Standard Deviations
Detroit Word Test	16.419	9.395
Gamelytor and Ferguson Mobile Test, Level One	56.174	24.606
Metropolitan Achievement Test	58.191	30.062
Teachers' Marks, General Scholarship	75.972	11.372
Metropolitan Reading Achievement Test	48.172	19.372
Teachers' Marks, Reading Scholarship	15.652	4.647

TABLE VI

RAW SCORES MADE BY EACH PUPIL ON EACH MEASURE USED IN THIS STUDY

	BETTS VISUAL SENSATION AND PERCEPTION TESTS												OTHER PROGNOSTIC TESTS USED IN THIS STUDY										ACHIEVEMENT TESTS USED IN THIS STUDY					
	Does binocular vision exist?	Is fusion normal at reading distance?	Are both eyes efficient working together?	Is the left eye efficient, both eyes working together?	Is the right eye efficient, both eyes working together?	Are the eyes balanced vertically?	Has depth perception been developed?	Is lateral eye balance at distance normal?	Is lateral eye balance at reading distance normal?	Is fusion normal at reading distance?	Is there minimum acuity for fine print at reading distance?	Is there minimum sharpness of image at distance?	Betts Word Form Test	Betts Auditory Span Test	Pressey's Primary Classification Test	Pintner-Cunningham Primary Mental Test	Metropolitan Readiness Test	Monroe's Reading Aptitude Test	Teacher's Rating of First Grade Pupils	Chronological age in months	Mental age in months	Intelligence quotient (I.Q.)	Detroit Word Test	Oculomotor and Perception Habits Test, Level one	Metropolitan General Achievement Test	Teacher's Marks, General Scholarship	Metropolitan Reading Achievement Test	Teacher's Marks, Reading Achievement Test
2.	y	n	y	y	y	y	y	y	y	y	y	y	28	18	55	42	111	76	20	79	106	122	41	87	121	79	57	16
3.	y	n	y	y	y	y	y	n	y	y	y	n	19	19	46	33	97	67	19	75	85	113	29	93	139	76	79	15
4.	y	n	y	y	y	y	n	n	n	n	n	n	15	14	33	34	82	33	10	84	86	102	23	70	101	62	44	15
5.	y	y	y	y	y	y	n	y	y	y	y	n	25	18	48	49	105	49	16	77	106	138	34	87	127	68	69	15
6.	y	n	y	y	y	y	y	y	y	y	y	y	19	18	36	46	113	82	19	79	102	129	37	94	137	65	81	16
7.	y	y	y	y	y	y	n	y	y	n	y	y	25	12	40	38	103	57	12	69	91	132	25	77	104	68	57	14
8.	y	y	y	y	y	y	n	y	y	y	y	y	24	9	39	33	81	40	15	78	85	109	28	88	116	72	66	15
9.	y	y	y	y	y	y	y	y	y	y	y	y	20	14	38	36	90	73	20	70	89	127	28	98	125	67	66	15
10.	y	n	y	y	y	y	n	y	y	n	n	n	20	17	35	32	98	39	13	85	83	98	24	60	105	61	56	11
11.	y	y	y	n	y	y	n	y	y	y	n	y	16	16	52	46	99	45	15	93	69	74	35	58	120	68	64	15
12.	y	n	y	y	y	y	y	n	y	n	y	y	26	23	50	41	98	53	15	83	95	114	30	87	116	77	62	16
13.	y	n	y	y	y	y	y	y	y	y	y	y	26	14	66	51	107	68	22	78	108	138	33	102	143	80	85	17
14.	y	y	n	n	y	y	n	y	y	y	y	y	19	18	39	37	97	49	19	84	90	107	27	65	109	70	60	15
15.	y	y	y	y	y	y	n	y	y	y	n	n	28	12	49	44	113	86	18	76	99	127	38	92	131	80	80	16
16.	y	n	n	n	y	y	n	y	y	y	y	y	25	18	33	39	100	59	17	92	111	119	27	74	119	81	72	17
17.	y	y	y	n	y	y	n	y	y	y	y	y	23	20	51	41	103	46	20	80	95	119	39	81	129	81	71	16
18.	y	y	y	y	y	y	n	y	y	y	y	y	25	16	36	25	93	57	19	73	74	101	22	99	125	75	71	16
19.	y	n	y	y	y	y	y	y	y	y	y	y	29	17	59	49	107	74	19	77	106	136	35	91	143	83	80	18
20.	y	y	y	y	y	y	n	y	y	y	y	n	15	8	37	28	79	46	16	73	78	107	31	91	105	79	65	16
21.	y	n	y	y	y	y	y	y	y	y	y	y	29	16	63	46	116	69	21	78	102	131	34	103	147	81	86	16
22.	y	y	y	y	y	y	n	y	y	y	y	y	27	18	43	38	96	57	21	77	91	117	34	98	121	79	67	16
23.	y	y	y	y	y	y	n	y	y	y	y	y	24	10	41	37	97	46	17	79	90	114	29	82	122	73	65	16
24.	y	y	y	y	n	y	n	y	y	y	n	n	28	19	52	43	99	87	22	74	98	132	38	99	126	84	68	16
25.	y	y	y	y	y	y	n	y	y	y	y	y	20	13	36	41	92	39	18	75	95	127	30	107	147	83	89	17
26.	y	n	y	y	y	y	y	y	y	y	y	y	26	15	33	42	101	75	20	80	96	120	38	92	133	80	81	16
27.	y	n	y	y	n	y	n	y	n	n	n	n	25	18	39	47	106	75	20	73	103	141	33	71	150	80	87	16
28.	y	n	y	y	y	y	n	y	y	y	y	y	20	15	34	30	85	35	15	72	81	111	29	96	110	72	71	15
29.	y	y	y	n	y	y	y	y	y	y	y	y	21	12	46	40	85	48	12	82	94	115	26	90	128	70	71	15
30.	y	y	y	y	y	y	y	y	y	n	y	y	28	20	52	45	113	68	23	80	101	114	40	83	140	84	78	18
31.	y	n	y	y	y	y	n	y	y	n	n	n	20	5	43	42	62	27	10	90	96	106	21	62	92	62	49	12
32.	y	y	y	y	y	y	n	y	y	y	y	y	26	14	27	41	99	80	24	70	95	136	31	101	146	88	84	19
33.	y	n	y	n	y	y	n	y	y	y	y	y	14	14	21	36	84	49	16	84	89	106	18	65	78	79	34	16
34.	y	n	y	y	y	y	n	y	y	n	n	n	20	10	29	35	78	48	20	81	87	107	23	92	113	88	64	16
35.	y	n	y	n	y	n	n	y	y	n	n	y	15	15	29	26	83	79	20	70	75	107	18	68	102	84	58	16
36.	y	n	n	y	y	y	n	y	y	y	y	y	24	12	26	39	77	84	20	71	93	131	12	68	140	79	45	16
37.	y	y	n	n	y	y	n	y	y	y	y	n	19	18	22	15	53	45	18	79	63	81	3	41	43	53	17	9
38.	y	y	y	y	y	y	n	y	y	y	y	y	18	12	27	37	90	62	22	78	90	110	3	26	86	80	39	12
39.	y	n	y	y	y	y	y	n	y	n	n	y	22	20	31	39	97	63	16	82	93	113	27	45	147	87	48	15
40.	y	n	y	y	y	y	n	y	y	n	n	n	16	7	17	25	66	50	20	74	74	100	0	12	28	58	5	8
41.	y	n	y	y	y	y	y	y	y	n	y	y	20	15	22	22	88	59	19	77	70	88	21	90	119	87	65	16
42.	y	y	y	y	y	y	y	n	y	y	y	n	26	12	19	39	83	57	21	78	93	119	15	41	96	83	39	13
43.	y	y	y	y	y	y	n	y	y	y	y	y	25	13	30	29	87	45	20	79	79	100	4	49	74	77	22	10
44.	y	y	y	y	y	y	n	n	y	y	y	y	13	8	37	28	88	70	17	81	78	96	26	91	107	84	57	16
45.	y	n	y	y	y	y	n	y	y	y	y	y	15	14	16	33	88	35	23	79	85	109	21	76	112	84	55	16
46.	y	n	y	y	y	y	n	y	y	y	y	y	13	14	24	26	75	26	15	82	75	91	8	64	77	76	34	12
47.	y	y	y	y	y	y	n	y	y	y	y	y	26	11	32	35	94	87	24	67	87	130	31	104	129	94	82	20
48.	y	n	y	y	y	y	n	y	y	y	y	y	19	19	23	26	87	67	21	70	75	107	20	94	112	84	65	16
49.	y	n	y	y	y	y	y	n	y	n	y	y	18	19	21	41	102	66	16	76	95	125	20	92	119	92	64	20
50.	y	n	y	y	y	y	n	y	y	y	y	y	18	10	24	40	75	44	15	74	94	113	19	69	98	85	51	16
51.	y	y	y	n	y	y	n	y	y	y	y	n	15	14	30	33	80	56	20	80	85	106	14	74	86	84	57	16
52.	y	n	n	y	y	y	n	y	y	y	n	y	20	16	15	37	91	45	15	78	90	115	24	98	102	74	56	16
53.	y	n	y	y	y	y	n	y	y	y	y	n	18	14	30	22	62	55	18	70	70	100	22	96	200	87	71	16
54.	y	y	n	n	y	y	n	y	y	y	y	y	20	9	32	30	85	16	25	91	81	89	26	92	117	80	66	16
55.	y	n	y	n	y	y	n	n	n	n	n	n	30	19	25	34	89	70	21	71	86	121	24	96	131	90	86	20
56.	y	n	y	y	y	y	n	y	y	y	y	n	16	12	10	30	73	53	15	71	81	114	12	59	90	80	49	12
57.	y	n	y	y	y	y	n	n	n	n	y	n	20	16	33	38	84	67	14	73	91	124	18	89	109	92	49	16
58.	y	n	n	n	y	y	n	y	y	n	y	n	17	15	21	27	66	42	15	70	76	109	14	65	122	60	48	12
59.	y	n	y	y	y	y	n	y	y	n	y	y	19	7	30	26	101	48	16	72	75	104	19	87	111	92	64	16
60.	y	n	y	n	n	y	n	n	y	y	y	y	15	15	20	31	80	34	17	78	82	105	24	94	135	96	76	16
61.	y	y	y	y	y	y	n	y	y	n	y	y	11	15	19	37	85	54	16	70	90	129	28	90	115	92	79	16
62.	y	n	y	y	y	y	y	y	y	y	y	y	25	15	29	33	104	78	19	72	85	118	24	74	127	92	64	16
63.	y	y	y	y	y	y	y	y	y	n	y	y	23	10	19	31	89	70	17	78	82	105	17	16	79	92	48	16
64.	y	y	y	n	y	y	n	y	y	y	n	n	25	18	36	30	88	37	22	79	81	103	28	88	125	80	67	16
65.	y	y	y	y	y	y	n	y	y	y	y	y	21	13	21	36	100	71	20	74	74	100	34	89	194	92	66	16
66.	y	y	y	y	y	y	n	n	y	y	y	y	13	15	8	34	87	46	15	89	86	96	19	80	95	92	46	16
67.	y	y	n	n	y	y	n	n	y	n	y	n	22	17	29	37	78	67	16	79	90	114	28	100	138	92	77	16
68.	y	y	y	y	y	y	n	n	y	n	n	n	9	6	2	22	53	14	8	81	70	86	6	14	37	45	15	8
69.	y	n	y	n	y	y	n	y	y	y	y	y	9	9	10	20	59	24	18	69	68	99	4	45	27	80	23	12
70.	y	n	y	y	y	y	n	y	y	y	y	n	18	13	9	34	70	47	18	70	86	123	14	51	88	64	41	12
71.	y	n	y	y	y	y	n	y	y	y	y	n	11	5	1	24	63	16	19	75	73	98	5	51	62	67	27	12
72.	y	y	y	y	y	y	n	y	y	y	y	y	12	9	17	21	40	37	20	77	69	90	16	64	74	77	29	16
73.	y	y	y	y	y	y	n	y	y	y	y	y	7	12	7	15	53	36	16	70	63	90	8	34	84	69	39	12
74.	y	n	y	y	y	y	n	y	y	y	y	y	10	10	6	21	66	21	16	92	69	75	13	38	72	65	35	15
75.	y	n	y	y	y	y	n	n	y	y	n	y	20	10	25	23	65	38	14	74	72	97	2	13	44	58	17	8
76.	y	n	y	y	y	y	n	y	y	y	y	y	19	13	15	40	93	66	20	70	94	134	17	44	99	77	41	14
77.	y	y	y	y	y	y	y	y	y	y	y	y	8	19	10	32	77	57	14	71	83	117	10	28	62	83	22	12
78.	y	n	y	y	y	y	n	y	y	y	y	y	18	17	20	29	71	45	12	69	79	114	0	29	38	50	9	8
79.	y	n	y	y	y	y	y	y	y	n	y	y	20	9	12	23	68	42	11	75	72	96	11	58	67	66	31	12
80.	y	n	y	y	y	y	n	y	y	n	n	y	14	13	1	18	66	18	18	85	66	77	10	61	74	60	28	10
81.	y	n	y	y	y	y	n	y	y	y	n	n	6	1	9	10	33	28	11	71	57	80	2	20	40	58	11	8
82.	y	n	y	n	n	y	n	y	y	y	n	n	19	9	9	13	46	13	13	79	60	76	5	24	48	52	17	8
83.	y	n	y	y	y	y	n	y	y	n	y	y	22	16	22	37	75	37	21	82	90	110	8	54	74	65	31	12
84.	y	n	y	y	y	y	y	y	y	y	y	y	23	9	37	31	82	37	12	80	82	103	2	36	76	74	18	12
85.	y	y	y	y	y	y	n	y	y	y	y	y	19	16	6	28	72	76	19	71	87	110	12	56	76	77	32	14
86.	y	n	y	y	y	y	n	y	y	n	y	y	22	11	0	34	76	36	21	79	86	109	21	41	77	80	41	16
87.	y	n	y	n	y	y	n	y	y	n	n	n	14	5	4	8	26	24	8	70	54	79	6	55	44	74	14	12
88.	y	n	n	y	n	y	n	y	y	y	n	n	16	5	14	23	48	16	13	75	72	97	15	48	60	76	28	16
89.	y	n	y	y	y	y	n	y	y	y	y	y	28	13	31	36	81	63	20	71	89	126	23	79	100	83	52	18
90.	y	n	y	y	y	y	n	y	y	y	y	n	21	7	39	30	81	45	20	78	81	104	12	61	51	73	22	12
91.	y	y	y	y	y	y	y	y	y	n	y	y	16	10	17	31	69	66	20	69	82	119	18	67	79	80	33	16
92.	y	y	y	y	y	y	y	y	y	y	n	n	20	14	31	31	67	49	16	70	82	117	17	67	73	79	36	16
93.	y	y	y	y	y	y	n	y	y	y	y	y	21	14	48	33	83	48	13	79	85	108	10	58	76	75	35	12
94.	y	y	y	y	y	y	n	y	y	y	y	y	26	12	38	36	91	45	19	73	89	122	30	95	132	89	74	16
95.	y	n	y	y	y	y	n	y	y	y	y	y	19	12	48	43	103	56	16	96	98	101	29	90	130	78	71	15
96.	y	n	y	y	y	y	n	y	y	y	n	n	18	18	41	36	92	40	18	91	89	98	28	79	118	78	60	14
97.	y	n	y	y	y	y	y	y	y	y	y	y	23	14	29	37	106	70	18	73	90	123	12	64	74	75	23	12
98.	y	n	y	y	y	y	n	y	y	y	y	y	17	14	32	32	83	31	16	81	83	102	17	24	54	71	26	11
99.	y	y	y	y	y	y	y	y	y	y	n	y	24	21	41	37	106	74	23	75	90	118	27	75	120	86	65	16
100.	y	n	y	y	y	y	n	y	y	y	y	n	22	9	30	35	90	68	19	69	87	126	27	65	120	87	57	16
101.	y	n	y	y	y	y	n	y	y	y	y	y	16	16	30	35	77	54	14	71	87	122	17	27	89	79	28	15
102.	y	n	y	n	y	y	n	y	y	y	y	y	19	15	41	43	102	60	19	73	98	134	18	66	101	92	39	16
103.	y	y	y	y	y	y	y	y	y	y	n	n	21	21	36	36	90	56	20	74	89	121	25	68	106	85	55	16
104.	y	y	y	y	y	y	y	y	y	n	y	y	21	15	31	39	88	76	18	74	93	126	24	65	108	84	47	16
105.	y	n	y	y	y	y	y	y	y	n	y	y	17	17	34	41	98	76	10	77	95	123	12	27	74	74	30	12
106.	y	y	y	y	y	y	n	y	y	y	y	y	20	13	46	40	95	56	18	81	94	116	30	80	119	85	63	16
107.	y	n	y	n	y	y	y	n	y	y	n	n	15	13	48	43	105	40	14	76	98	126	17	64	106	73	46	16
108.	y	n	y	n	y	y	n	y	y	y	y	y	14	14	27	35	80	50	19	76	87	112	23	53	91	84	46	16
109.	y	n	y	y	y	y	n	y	y	y	y	y	13	14	33	36	91	50	18	81	89	110	23	59	91	85	39	16
110.	y	n	y	y	y	y	n	y	y	n	y	y	24	16	33	38	99	65	23	79	91	115	22	81	119	80	64	16
111.	y	y	y	y	y	y	n	y	y	y	n	n	13	19	36	44	83	59	22	72	99	124	14	35	94	81	39	14
112.	y	n	y	y	y	y	y	y	y	y	y	y	25	20	30	42	101	69	23	74	96	130	24	84	112	98	61	20
113.	y	n	y	y	y	y	y	y	y	n	y	y	22	16	56	42	98	72	22	72	96	133	19	53	92	90	38	16
114.	y	y	y	y	y	y	n	y	y	y	y	y	20	14	36	37	84	20	18	81	90	110	5	17	47	69	20	8
115.	y	n	y	n	y	y	n	n	y	y	y	y	22	14	20	38	80	31	7	77	91	106	15	12	62	42	26	6
116.	y	y	y	y	y	y	n	n	y	y	y	y	24	9	41	32	85	52	10	71	83	117	12	66	71	46	32	8
117.	y	y	y	y	y	y	y	y	y	y	y	n	18	9	18	37	83	76	18	74	90	122	22	73	106	80	52	14
118.	y	n	y	y	y	y	y	y	y	n	y	y	7	20	28	34	100	55	17	75	86	115	28	94	132	80	68	14
119.	y	n	y	y	y	y	y	y	y	y	n	y	20	11	15	38	85	30	19	84	91	108	18	72	99	74	50	12
120.	y	n	y	y	y	y	n	y	y	n	y	n	29	18	42	42	100	23	14	108	96	88	28	60	103	71	50	12
121.	y	n	y	y	n	y	n	n	y	n	n	n	20	15	24	30	79	39	11	83	81	98	12	52	99	69	39	12
122.	y	n	y	n	y	y	n	y	y	y	y	y	28	13	16	26	84	34	17	76	75	98	14	69	84	63	42	12
123.	y	y	y	y	y	y	n	y	y	y	y	y	18	11	21	31	90	42	18	79	82	104	13	31	74	63	37	12
124.	y	n	y	y	y	y	y	y	y	y	n	n	12	14	17	36	90	46	18	77	89	116	22	68	101	66	44	12
125.	y	n	y	y	y	y	n	y	y	n	y	y	18	13	25	38	93	58	23	74	91	124	11	35	75	69	32	12
126.	y	n	y	n	n	y	n	y	y	y	y	y	19	11	11	37	76	34	20	73	90	123	26	89	112	63	56	12
127.	y	n	y	y	y	y	n	y	y	y	n	y	26	10	17	28	69	17	14	95	78	80	14	48	71	66	38	12
128.	y	n	y	n	y	y	n	y	y	n	n	n	20	15	24	31	73	24	13	101	82	81	14	27	69	66	35	12
129.	y	y	y	y	y	y	n	y	y	y	y	n	16	14	24	31	89	29	20	71	82	115	24	84	107	66	51	12
130.	y	y	y	y	y	y	n	y	y	y	y	y	16	11	26	25	81	43	22	73	74	101	22	84	92	69	49	12
131.	y	n	y	y	y	y	n	y	y	y	n	n	21	9	22	31	88	41	17	78	82	105	15	61	71	63	32	12
132.	y	y	y	y	y	y	n	y	y	y	y	n	13	5	16	28	72	12	11	101	78	96	27	76	99	63	57	12
133.	y	n	y	y	y	y	n	y	y	n	y	n	16	10	33	24	63	48	19	77	73	95	20	70	94	63	43	12
134.	y	n	y	y	y	y	n	y	y	n	y	y	25	16	39	45	98	58	16	95	101	106	28	63	113	63	57	12
135.	y	n	n	y	y	y	n	y	y	y	n	n	17	14	16	39	87	35	16	75	93	124	24	55	106	66	55	12
136.	y	n	y	y	y	y	n	y	y	y	y	y	20	15	25	36	90	26	17	84	89	106	17	83	122	75	61	13
137.	y	y	n	n	n	y	n	y	y	n	n	n	22	14	28	34	86	40	18	79	86	109	8	55	73	63	25	12
138.	y	y	y	y	y	y	n	y	y	y	y	y	25	10	23	39	99	60	17	74	93	126	26	68	98	66	46	12
139.	y	n	y	y	y	y	n	n	y	n	y	y	16	11	23	39	78	34	16	82	93	113	23	79	118	63	61	12
140.	y	n	y	n	y	y	n	y	y	n	y	n	13	5	21	25	84	12	23	73	74	101	10	75	83	63	41	12
141.	y	y	y	y	y	y	n	y	y	y	y	y	15	9	23	39	71	47	14	75	93	124	16	35	90	66	39	12
142.	y	n	y	y	y	y	n	y	y	y	y	y	18	14	9	29	90	53	21	75	79	105	27	95	130	84	74	16
143.	y	n	y	y	y	y	n	y	y	n	y	n	16	19	23	37	89	42	14	80	90	113	16	48	86	66	46	12
144.	y	n	y	y	y	y	n	y	n	y	n	n	23	9	35	25	88	53	10	76	74	97	27	93	111	63	64	12
145.	y	y	y	y	y	y	y	y	y	y	y	y	22	12	20	39	102	45	22	77	93	121	28	99	142	110	80	20
146.	y	n	y	n	y	y	n	y	y	n	n	n	9	16	33	35	87	38	18	79	87	109	27	55	110	75	49	12
147.	y	n	y	y	y	y	n	y	n	y	y	n	19	14	20	36	60	40	11	79	75	95	9	48	89	65	34	12
148.	y	n	n	y	y	y	n	y	y	n	y	y	20	11	4	33	79	37	17	85	95	86	13	80	107	63	50	12
149.	y	n	y	y	y	y	n	n	y	n	n	n	15	13	9	22	82	28	15	94	70	74	18	56	104	67	48	14
150.	y	n	y	n	y	y	n	y	y	n	y	y	13	13	18	25	73	64	16	70	74	105	13	77	91	74	41	16
151.	y	n	n	n	n	y	n	y	y	n	n	n	18	5	33	31	74	24	18	79	82	104	16	76	96	68	42	12
152.	y	y	n	n	y	y	n	y	y	y	y	y	16	9	21	27	66	8	7	75	76	101	2	21	47	54	17	9
153.	y	n	y	n	y	y	n	y	y	n	n	n	22	5	1	21	8	25	20	73	69	94	16	49	75	65	33	12
154.	y	n	y	n	n	y	n	y	y	n	y	n	11	10	29	22	45	55	13	71	70	99	21	89	115	68	68	16
155.	y	y	y	n	y	y	n	y	y	n	n	n	10	5	10	22	73	5	18	90	70	77	4	62	63	59	18	11
156.	y	y	n	n	n	y	n	y	y	y	n	n	14	12	19	34	83	40	12	76	86	110	9	58	89	63	36	12
157.	y	n	y	y	y	y	y	y	y	y	n	y	16	9	14	24	87	48	20	79	82	103	23	86	105	71	45	12
158.	y	n	y	n	y	y	n	y	y	n	n	n	16	10	20	9	45	27	15	80	55	78	11	89	76	64	38	12
159.	y	y	y	y	y	y	y	y	y	y	y	y	22	13	1	28	69	70	17	70	78	111	9	55	86	63	32	12
160.	y	n	n	n	n	y	n	y	y	y	n	n	18	5	19	19	35	14	14	78	67	85	10	20	55	63	26	9
161.	y	n	n	n	n	y	n	y	y	n	n	n	11	8	0	19	48	5	11	75	67	88	2	5	35	50	12	6
162.	y	n	y	n	y	y	n	n	y	n	n	n	19	9	17	21	70	20	14	81	69	86	7	20	74	70	31	12
163.	y	n	n	n	n	y	n	y	y	y	y	y	15	20	8	32	80	40	11	73	83	113	4	16	63	53	18	9
164.	y	y	n	y	y	y	n	n	y	n	n	n	6	18	15	32	67	24	8	74	83	112	3	23	51	54	19	9
165.	y	y	y	y	y	y	n	y	y	y	n	y	12	3	0	20	59	34	9	81	68	84	6	52	75	63	29	12
166.	y	n	y	y	y	y	n	y	y	y	y	y	19	14	15	32	80	48	10	75	83	111	21	86	113	72	60	16
167.	y	n	y	n	y	y	n	y	y	n	n	n	18	15	2	24	61	15	13	79	73	92	14	55	92	68	43	15

APPENDIX B

TEACHER'S RATING OF FIRST GRADE PUPILS

Name of pupil _____ School _____
Date _____ Sex _____ Teacher _____
"Note" Check the division in which you think the pupil should be classified.

Social Adaptation

Excellent | Good | Average | Poor | Failing

Plays well with others
Un-obtrusive
Un-selfish and popular
Is at ease with teacher and group
Obedient, keeps order
Is usually mature

Interferes and is rough with others
Shows off
Selfish and unpopular
Is timid and self conscious
Dis-obedient, creates confusion
Is very im-mature, baby-ish

Personal Characteristics

Excellent | Good | Average | Poor | Failing

Independent, has initiative
Energetic, gives sustained attention
Persistant, imaginative
Careful, neat, quiet
Purposeful, questioning
Not destructive or wasteful
Stable and self confident

Dependent, must be directed
Lethargic, in-attentive, lazy
Gives up easily, un-imaginative
Careless, messy, noisy
Aimless, in-curious
Destructive and wasteful
Confused and uncertain

Emotional Stability

Excellent | Good | Average | Poor | Failing

Cheerful, non variable mood
Not nervous or self conscious
Deliberative, controls tears
Is a good sport, controls temper
Enjoys school
Spontaneous and venturesome
Patient and forgiving

Grave, variable mood
Nervous, self conscious, excitable
Impulsive, cries easily
Is stubborn and sulky, shows temper
Is bored and afraid
Restrained and timid
Impatient and revengeful

Ability to Learn

Excellent | Good | Average | Poor | Failing

Quick and bright
Stable and mature
Excellent background of experiences
Fine attitude toward learning
Proper attitude toward effort
Good health
Has good learning habits

Very slow and dull
Confused, uncertain, baby-ish
Poor background of experiences
Poor attitude toward learning
Wrong attitude toward effort
Physical health undermined
Has poor learning habits

Reading Readiness

Excellent | Good | Average | Poor | Failing

Wants to learn to read
Has good speaking vocabulary
Shows much interest in telling stories, in being told stories, in being read to
Excellent motor control, pure laterality
Remembers word forms, sees and uses relationships, thinks abstractly
Good experiential background
Good vision and hearing

Not interested in learning to read
Poor speaking vocabulary, "baby talk"
Shows little or no interest in stories and pictures
Poor motor control, mixed laterality
Cannot remember word forms, see, or use relationships
Poor experiential background
Poor vision and hearing