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A concurrent validation study of standardized reading and arithmetic tests as demonstrated in Henrico County, Virginia

Edna Wagstaff Warncke

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A CONCURRENT VALIDATION STUDY OF STANDARDIZED
READING AND ARITHMETIC TESTS AS DEMONSTRATED
IN HENRICO COUNTY, VIRGINIA

A Thesis
Presented to
the Graduate Faculty of
The University of Richmond

In Partial Fulfillment
of the Requirements for the Degree
Master of Science in Education

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by
Edna Wagstaff Warncke

August 1965

APPROVAL SHEET

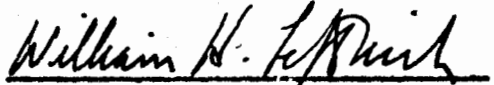
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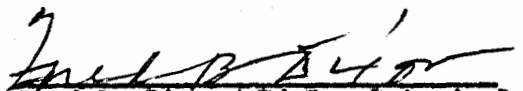
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This study was made under the direction of Dr. Edward F. Overton, Chairman of the Department of Education.

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CHAPTER I

INTRODUCTION

Tests have been standardized to determine a wide variety of things including: interest, aptitude, creativity, motivation, intelligence, achievement and readiness. Controversy has emerged in educational circles concerning the value of these tests. This controversy has ranged from feelings that all tests should be discarded to feelings that a more widespread use of testing should be adopted in all areas of life. In Henrico County, Virginia, concern has been expressed as to the value of the currently used testing program. Much of the available literature was not pertinent to the problem. Therefore, this concurrent validation study was prepared to the end of providing statistical data which would serve useful in this evaluative movement.

A study which attempts to establish the validity of a testing program demands that results of large numbers of administered tests be compiled and interpreted. The thorough, satisfying process is long, tedious, and therefore self-limiting. For these reasons the study reported in this paper has been limited to a determination of the relationship between standardized test scores given to children in Henrico County in the first and fourth grades and teacher grades in the fourth grade. Areas of the study are reading and arithmetic. The specific purposes of the study were to determine the long range predictive value of the Metropolitan Readiness Test and the relationship between achievement and intelligence. A total of nine correlations was obtained from the following comparisons:

Metropolitan Readiness Test, Reading Readiness
Versus
Science Research Associates Achievement Test, Reading Comprehension

Metropolitan Readiness Test, Number Readiness
Versus
Science Research Associates Achievement Test, Arithmetic Concepts

Metropolitan Readiness Test, Total Readiness
Versus
Science Research Associates Achievement Test, Total Grade Equivalent

Metropolitan Readiness Test, Total Readiness
Versus
Lorge-Thorndike Intelligence Test, Total Intelligence Quotient

Metropolitan Readiness Test, Reading Readiness
Versus
Teacher Evaluation, in Reading, Grade Four

Metropolitan Readiness Test, Number Readiness
Versus
Teacher Evaluation in Arithmetic, Grade Four

Science Research Associates Achievement Test, Reading Comprehension
Versus
Teacher Evaluation in Reading, Grade Four

Science Research Associates Achievement Test, Arithmetic Concepts
Versus
Teacher Evaluation in Arithmetic, Grade Four

Science Research Associates Achievement Test, Total Grade Equivalent
Versus
Lorge-Thorndike Intelligence Test, Total Intelligence Quotient

CHAPTER II

PROCEDURE AND SAMPLE

During the first month of the school year, all first grade children in Henrico County were given the Metropolitan Readiness Test. This test was administered by the first grade teachers to groups ranging from ten each to the entire class, within a time limit of one or two days. These tests were then scored by the individual teachers as instructed in the Metropolitan Readiness Test manual. The test yields a reading readiness score, a number readiness score and a total readiness score for each pupil.

I. THE PROCEDURE

The first purpose of this paper was to determine the long range predictive value of the Metropolitan Readiness Test scores. The first method of determining the predictive value was the comparison of the Metropolitan Readiness Test, given in the fall of the first grade year, with the Science Research Associates Achievement Test which was given in the spring of the fourth grade year. The subtest reading readiness scores were compared with the Science Research Associates Achievement Test grade equivalent subtest scores in the area of reading comprehension. The subtest number readiness scores on the Metropolitan Readiness Test were compared with the Science Research Associates Achievement Test grade equivalent subtest scores in the area of arithmetic concepts. The total readiness scores on the Metropolitan Readiness Test were compared

with the Science Research Associates Achievement Test total grade equivalent scores.

A second method of determining the long range predictive value of the Metropolitan Readiness Test was to compare total readiness scores with the total intelligence quotient scores yielded by the Lorge-Thorndike Intelligence Test. This test was administered to fourth grade children in the fall of the fourth grade year.

A third method of determining the predictive value of the Metropolitan Readiness Test was to compare Metropolitan Readiness subtest scores with teacher evaluations of grade four pupil accomplishments in reading and in arithmetic.

A total of six correlations was determined. These correlations compared Metropolitan Readiness Test scores with Science Research Associates Achievement Test scores, Lorge-Thorndike Intelligence Tests, and teacher evaluations of fourth grade pupil achievement in the areas of reading and arithmetic.

Other correlations were made to determine (1) how Science Research Associates Achievement Test scores in the areas of reading comprehension and arithmetic concepts correlated with achievement in these two areas as indicated by teacher evaluations of the fourth grade pupil, and (2) how Science Research Associates Achievement Test scores correlated with intelligence test scores as yielded by Lorge-Thorndike Intelligence Test scores.

For these comparisons to be made, it was necessary that scores on all three tests be converted to numerical values. This was accomplished

by using a scale from one to five. The intervals were determined by dividing the total range by five and grouping one fifth of the scores in each interval. The numeral one (1) was chosen as the lowest value with scores ranging upward to five (5). The conversions were as follows:

TABLE I
CONVERSION OF STANDARDIZED TEST SCORES

SRA	Large-Thorndike	Metropolitan	Teacher Grades
2.0-3.6 1	70- 82 1	E 1	E or F 1
3.7-5.2 2	83- 95 2	D 2	D 2
5.3-6.7 3	96-109 3	C 3	C 3
6.8-8.3 4	110-122 4	B 4	B 4
8.4-9.9 5	123-136 5	A 5	A 5

The correlations were obtained for these standardized test scores by the use of the tetrachoric correlation coefficient (r_{tet}). The tetrachoric was the correlation coefficient of choice for the purposes of accommodating letter grades of academic achievement. These letter grades cannot be assigned the specific scores on the continuous basis which is necessary for use of other more accurate coefficients.

The tetrachoric r is computed from data in which both X and Y variables have been reduced artificially to two categories. Under the appropriate conditions it gives a coefficient that is numerically equiva-

lent to the Pearson r and may be regarded as an approximation to it. The complete equation for the r_{tet} is involved. Consequently numerous shortcut methods have been devised for estimating it. The one used for computation in this study follows:¹

$$r_{\cos-pi} = \cos \left(\frac{180^\circ}{1 + \frac{ad}{bc}} \right)$$

II. THE SAMPLE

Scores for the three tests being studied were obtained from Henrico County test records for each child in the sample group. All elementary schools in existence in the years 1959 and 1960 were included in the sample study. The Metropolitan Readiness Test records were arranged in alphabetical order according to schools. The first child from each school was chosen and every tenth child thereafter. This made the total sample 10.5 percent of the total first grade enrollment in each of these years. If the tenth child was no longer enrolled in the fourth grade, the next child was chosen. After a child was chosen from the first grade Metropolitan Readiness Test teacher listing, this child was located in the fourth grade test records for the Science Research Associates Achievement Test and the Lorge-Thorndike Intelligence Test. In

¹J. P. Guilford, Fundamental Statistics in Psychology and Education (New York Toronto London: McGraw-Hill Book Company, Inc., 1956), pp. 306-307.

addition, fourth grade teacher evaluations for each child were obtained in terms of yearly average letter grades in the areas of reading and arithmetic.

The sampled student group which involved teacher grades was 428 in number while the original sample was 481. This differential was dictated by the facts that twenty-four children had withdrawn before the end of their fourth grade year and final grades were not available and that twenty-nine students were currently enrolled in a non-cooperating school. These factors made the teacher grade sample a total of eleven percent less than the original sample. Four correlations involved teacher grades: Metropolitan Number Readiness versus teacher grades in arithmetic, Metropolitan Reading Readiness versus teacher grades in reading, Science Research Associates Achievement Test arithmetic concepts versus teacher grades in arithmetic, and Science Research Associates Achievement Test reading comprehension versus teacher grades in reading.

There were twenty-one elementary schools involved in this study. The total enrollment in the first grade, at the time the Metropolitan Readiness Test was given in the year 1959-60, was 2280. The sample for the year 1959-60 was 236 children. The total enrollment in the first grade at the time the Metropolitan Readiness Test was given in the year 1960-61 was 2412. The sample for that year was 245. After the information was obtained for the two individual years, it was compiled. This yielded a total two year enrollment of 4692 for the period of time when the Metropolitan Readiness Test was given and the two year sample of 481

for the years 1959-61. Of this number 232 were boys and 249 were girls.

TABLE II
DISTRIBUTION OF BOYS AND GIRLS IN THE SAMPLED YEARS

	1959-60	1960-61	Total
Boys	114	118	232
Girls	122	127	249
Total	236	245	481

The ages of the sampled children, at the time of the Metropolitan Readiness Test, ranged from 5.11 to 7.10. Of the entire two year sample, twenty-eight children were between 6.11 and 7.10 years of age. This indicated that these twenty-eight children were repeating the first grade, or that approximately six percent of the entire sample were first grade repeaters during the years 1959-61. These repeaters were included in the correlations, and in almost every case were low achievers in the fourth grade. Exactly half of the group had tested intelligence quotients of below ninety-five on the fourth grade Lorge-Thorndike Intelligence Test. When the Metropolitan Readiness Test was administered, the tested pupils without exception scored a letter grade of C or above on each part of the test and on the total readiness. A large majority of the children scored either A or B on the subtests of the Metropolitan Readiness Test and on the total readiness. This fact obviously lowered the correlations of the Metropolitan Readiness Test.

CHAPTER III

DESCRIPTION OF STANDARDIZED TESTS USED IN STUDY

I. METROPOLITAN READINESS TEST

The norms for the Metropolitan Readiness Tests were established by means of a national standardization program in which fifty-six communities from twenty-six states participated. The tests were administered to beginning first grade pupils during the first month after the opening of school in the fall of 1948.²

Two equivalent forms of the battery are currently available. The battery used by Henrico County in the years 1959 and 1960 included the following tests:³

1. WORD MEANING. In each row of four pictures, the subject selects the one that illustrates the word the examiner names.
2. SENTENCES. This test is similar to Test 1, except that phrases and sentences are used instead of single words.
3. INFORMATION. The subject again marks the one picture in each row of four which corresponds to the examiner's oral description, but the objects are now described in terms of use or function. E.g., "mark the one you take pictures with."
4. MATCHING. This test requires the recognition of similarities and differences in visual material, including pictures of objects, geometric forms, numbers, letters and words.

²Gertrude H. Hildrith and Nellie Griffiths, Metropolitan Readiness Test Teacher's Manual (New York: Harcourt Brace and World, 1958), p. 30.

³Anne Anastasi, Psychological Testing (New York: Macmillan Co., 1954), p. 475.

5. NUMBERS. Covering a wide variety of quantitative concepts and simple numerical operations, this test resembles closely the quantitative tests included in intelligence and differential aptitude batteries for the primary grades.
6. COPYING. The subject copies simple geometric forms as well as numbers or letters. This test is related to both physical development and intellectual maturity in young children. It also reveals the tendency toward reversals in drawing and writing shown by some children.

Reading readiness scores were determined by compiling tests one through four; number readiness tests scores by test five; total readiness scores by a composite of all six scores. Readiness status was provided by the following table:⁴

TABLE III
USE OF RAW SCORES TO DETERMINE READINESS STATUS
ON METROPOLITAN READINESS TEST

Tests 1-4 Reading Readiness	Test 2 Number Readiness	Tests 1-6 Total Readiness	Letter Rating	Readiness Rating
61-66	21-24	90-100	A	Superior
56-60	16-20	80- 89	B	High Normal
47-55	10-15	65- 79	C	Average
33-46	5- 9	40- 64	D	Low Normal
0-32	0- 4	0- 39	E	Paor Risk

⁴Hildrith and Griffiths, op. cit., p. 32.

The reliability of the Metropolitan Readiness Test as stated in the test manual was moderate to moderately high; however, the manual failed to report overall correlation coefficients for the test. It also appeared to correlate well with first grade achievement as tested by the Metropolitan Achievement Test given in the first grade during standardization.⁵ There was no indication that studies had been made concerning its predictive value in later grades.

The Metropolitan Readiness Test has been one of the most widely used tests of its kind. The test is free from reading content and gives a fairly clear picture of the maturity of the first grader.⁶

II. SCIENCE RESEARCH ASSOCIATES ACHIEVEMENT TEST

The national standardization of the 4-6 battery of the SRA Achievement Test took place in May 1954. A total of 21,512 children were included in the original study. These children represented all sections of the country.⁷

The SRA Achievement Test Series includes three batteries. The first battery is to be used in grades 2-4. The next battery is to be used in grades 4-6, and the final battery is to be used in grades 6-9.

⁵ Ibid., pp. 29-30.

⁶ Oscar Krisen Buros, The Fifth Mental Measurements Yearbook (Highland Park, New Jersey: The Gryphon Press, 1959), p. 1550.

⁷ Louis P. Thorpe, D. Welty Lefever and Robert A. Naslund, SRA Achievement Series Technical Supplement (second edition; Chicago: Science Research Associates, 1957), p. 11.

The series includes a seven hour battery of subtests measuring work-study skills, reading, language usage and arithmetic. Cronbach described the test as an attractive one which used story materials to measure fundamental skills in meaningful contents. It was designed to give accurate end-of-year measures for average and able students. Retarded pupils earn such low scores on their proper grade level test that, for accurate measurement, they should be retested on the next lower level of the series.⁸

Henrico County children used in the study were administered the battery for grades 4-6. The test was given in the spring semester. It yielded percentile and grade equivalent scores in the following areas:⁹

WORK STUDY SKILLS

References
Charts

READING

Comprehension
Vocabulary

LANGUAGE ARTS

Capitalization and Punctuation
Grammatical usage

ARITHMETIC

Reasoning
Concepts
Computation

The reliability of the SRA Achievement Test as stated in the manual is moderately high and the validity of the test as compared to

⁸ Lee J. Cronbach, Essentials of Psychological Testing (second edition; New York: Harper and Brothers Publishers, 1960), p. 238.

⁹ SRA Manual, op. cit., p. 22.

teacher evaluation of achievement is high. The manual did not report overall reliability and validity coefficients.

The SRA Achievement Test has been generally considered a good measure of achievement for the average and above average children. Some degree of concern has been expressed about the lesser quality of the test when used with the slower learner. It has received much praise for its story-like content which seems especially fine in the lower grades.¹⁰

III. LORGE-THORNDIKE INTELLIGENCE TEST

The Lorge-Thorndike Intelligence Tests are a series of tests of abstract intelligence covering the range from kindergarten to college freshmen. Abstract intelligence is defined as the ability to work with ideas and the relationship among ideas. The tests are based on the premise that most abstract ideas with which the school child or the working adult deals are expressed in verbal symbols, so much so that verbal symbols are the appropriate medium for the testing of abstract intelligence.

The tests are available in five levels. The school grades in which the different levels should be used depends somewhat upon the type of community and type of school population involved. In the average community, the grades for which the levels are most appropriate are:

- Level 1 Kindergarten and Grade 1
- Level 2 Grades 2 and 3
- Level 3 Grades 4-6
- Level 4 Grades 7-9
- Level 5 Grades 10-12

Verbal Battery. The Verbal Battery is made up of subtests, each of which used the verbal medium. Of the different subtests, one also involves numerical tasks. The subtests are Work Knowledge, Sentence Completion, Verbal Classification, Verbal Analogies, and Arithmetic Reasoning. Experience over the years with tasks of these

¹⁰ Buros, op. cit., p. 350.

five types has indicated that such tasks provide a good and useful measure of ability to deal with abstractions presented in verbal form and that, since this type of ability is related to academic achievement, they provide a good index of scholastic aptitude.

Nonverbal Battery. The Nonverbal Battery is entirely pictorial, diagrammatic, or numerical. The subtests are Figure Analogies, Figure Classification and Number Series. For the average child, these tests will not predict school performance quite so well as scores based upon the Verbal Battery. However, they permit an appraisal of intelligence which is not influenced by specific disability in reading. Use of both the Verbal and Nonverbal Batteries is recommended for the appraisal of children in schools, because the discrepancies performance on the two tests may reveal significant facts about reading achievement, school progress, or vocational prospects.¹¹

Standardization. More than 136,000 children in 44 communities in 22 states were used to standardize the Lorge-Thorndike Intelligence Test.¹² Four types of norms were developed: (1) intelligence quotient equivalent, (2) grade percentile, (3) grade equivalent, and (4) age equivalent.¹³

Reliability and Validity. According to the Technical Manual for the Lorge-Thorndike Intelligence test both the reliability and validity of the test as a whole and of the individual parts are quite high. The manual did not report the overall test coefficients. Level 3 (Verbal Battery, Nonverbal Battery and intelligence quotient equivalent of the

¹¹Irving Lorge and Robert L. Thorndike, Lorge-Thorndike Intelligence Test Technical Manual (Boston: Houghton Mifflin Company, 1957), p. 2.

¹²Ibid., p. 5.

¹³Ibid., p. 6.

Lorge-Thorndike Test) was used in Henrico County, grade four sampled group.

A review of the Lorge-Thorndike Intelligence Test in the Buros Mental Measurement Yearbook by Frank S. Freeman indicated that this 1957 version of the Lorge-Thorndike Intelligence Test was, from the point of view of the psychological constructs upon which it was based and that of statistical standardization, among the best group tests available.¹⁴

A study was also quoted in Buros Mental Measurements Yearbook which showed correlation with reading and average arithmetic grade equivalents to be .87 and .76 respectively as derived from the Stanford Achievement Test. These data indicate that, potentially, intelligence tests will serve to predict achievement.¹⁵

¹⁴Buros, op. cit., p. 479.

¹⁵Ibid., p. 483.

CHAPTER IV

RESULTS

I. PREDICTIVE VALUE OF METROPOLITAN READINESS TEST

The first comparison was the Metropolitan Readiness test versus the Science Research Associates (SRA) Achievement Test. For organizational purposes the comparative study was broken down into subtest results.

Metropolitan Readiness Test Versus SRA Achievement Test

The children were divided into those who scored A or B on the Metropolitan Reading Readiness Test and those who scored C or below. These were categorized with those who scored 9.9-6.8 or 6.7-2.0 respectively on the SRA Achievement Test. This study yielded a moderate correlation and indicated that Metropolitan Readiness Test does predict with some accuracy the achievement of children in the fourth grade in the area of reading. The r_{tet} obtained was .47 with a .02 standard error.

TABLE IV
COMPARATIVE SCORES ON METROPOLITAN READINESS
AND SRA READING TESTS

SRA Reading Comprehension Grade Equivalent	Metropolitan Readiness - Reading		
	A or B	C or Below	Total
9.9-6.8	82	19	101
6.7-2.0	205	175	380
Total	287	194	481

Next a correlation was computed to determine the relationship between the Metropolitan Number Readiness Test and the SRA Achievement subtest score in the area of arithmetic concepts. Again the scores were divided as stated above. The r_{tet} obtained was .49 with a .02 standard error. This correlation was slightly stronger than the previous correlation for reading, and would appear to be an equal predictor of success.

TABLE V
COMPARATIVE ACHIEVEMENT SCORES ON METROPOLITAN READINESS
AND SRA NUMBERS

SRA Arithmetic Concepts	Metropolitan Readiness - Numbers		
	A or B	C or Below	Total
9.9-6.8	124	31	155
6.7-2.0	165	161	326
Total	289	192	481

The strongest relationship was obtained between the Metropolitan Readiness Test Total Readiness and the SRA Achievement Test Total Grade Equivalent. Here a much more valid prediction can be made concerning fourth grade achievement on the SRA Achievement Test. The r_{tet} for this correlation was .80 with a .02 standard error.

TABLE VI
COMPARATIVE ACHIEVEMENT SCORES ON METROPOLITAN READINESS
AND SRA OVERALL SCORES

Metropolitan Readiness	SRA - Total Grade Equivalent		
	9.9-6.8	6.7-2.0	Total
A or B	77	197	274
C or Below	5	202	207
Total	82	399	481

Metropolitan Readiness Test Versus Lorge-Thorndike Intelligence Test

The second method of determining the long range predictive value of the Metropolitan Readiness Test was a comparison of total readiness scores with the total intelligence scores, which were yielded by the Lorge-Thorndike Intelligence Test.

For the purpose of this comparison children were divided into those who scored A or B on the Metropolitan Readiness Test, and those who scored C or below. These groups were compared with those who scored 96 or above and 95 or below, respectively, on the Lorge-Thorndike Intelligence Test.

The r_{tet} obtained was .46 with a .02 standard error. This is a moderate correlation and indicates that the Metropolitan does have moderate predictive value.

TABLE VII
A COMPARISON OF TOTAL READINESS SCORES WITH
TOTAL TESTED INTELLIGENCE

Lorge-Thorndike Total I.Q.	Metropolitan Total Readiness		
	A or B	C or Below	Total
96 or above	238	131	369
95 or below	38	74	112
Total	276	205	481

Metropolitan Readiness Test Versus Fourth Grade Teacher Grades

A third method of determining the predictive value of the Metropolitan Readiness Test was to compare the Metropolitan Readiness subtest scores with teacher evaluations in the areas of reading and arithmetic in the fourth grade.

Metropolitan Reading Readiness Scores were first compared with reading grades in the fourth grade. This comparison yielded a moderately low correlation of .36 with a .02 standard error. These results present evidence that the Metropolitan Reading Readiness is a moderately low reliable predictor of teacher evaluation of grade four readers.

TABLE VIII

A COMPARISON OF FOURTH GRADE TEACHER GRADES IN READING
WITH METROPOLITAN READING READINESS SCORES

Metropolitan Reading Readiness	Teacher Grades - Reading		
	A or B	C or Below	Total
A or B	152	97	249
C or Below	67	112	179
Total	219	209	428

Metropolitan Number Readiness Scores were next compared with arithmetic grades earned by the study group of fourth graders. This comparison yielded a slightly lower correlation than the reading scores; a r_{tet} of .32 with a .02 standard error. These correlation results indicate that Metropolitan Readiness is probably the least reliable predictor of teacher evaluation of fourth grade pupil reading and arithmetic achievement.

TABLE IX

A COMPARISON OF FOURTH GRADE TEACHER GRADES IN ARITHMETIC
WITH METROPOLITAN NUMBER READINESS SCORES

Metropolitan Number Readiness	Teacher Grades - Arithmetic		
	A or B	C or Below	Total
A or B	141	107	248
C or Below	64	116	180
Total	205	223	428

The grades which are awarded pupils by their teachers are characteristically influenced by factors other than academic accomplishment. Work habits, ability level, personality patterns, rate of improvement, maturity level, and emotional factors are only examples of the numerous grade influencing factors which are outside the realm of actual achievement. The legitimacy of these factors, taken singularly or collectively, as grade influencers is not a problem to be treated here. An awareness of their existence is, however, significant to a meaningful interpretation of data presented here. Since correlations of Metropolitan Readiness Test with Achievement Tests and Intelligence Tests are moderately high there is indication that the Metropolitan Readiness Test is a good predictor of success in the fourth grade, at least as measured by achievement tests.

II. OTHER CORRELATIONS OF STANDARDIZED TEST SCORES AND TEACHER GRADES

A second purpose of this paper was (1) to determine how SRA Achievement test scores in the areas of reading comprehension and arithmetic concepts correlated with teacher evaluation in these two fourth grade areas, and (2) how SRA Achievement Test scores correlated with Intelligence Test scores as yielded by Lorge-Thorndike Intelligence Test scores.

SRA Reading Comprehension Versus Teacher Grades in Reading

Children were divided into two groups: those who were awarded A or B reading grades and those who were awarded reading grades of C or

below. These scores were compared with SRA scores, 9.9-6.8 and 6.7-2.0 respectively. The r_{tet} was .59 with a .02 standard error. This is a moderate correlation and appears to indicate that there is a relationship between grades given by the fourth grade reading teacher and the scores earned in the reading comprehension SRA Achievement Test.

TABLE X

A COMPARISON OF FOURTH GRADE TEACHER GRADES IN READING
WITH SRA READING COMPREHENSION SCORES

SRA Reading Comprehension	Teacher Grades - Reading		
	A or B	C or Below	Total
9.9-6.8	69	16	85
6.7-2.0	150	193	343
Total	219	209	428

SRA Arithmetic Concepts Versus Teacher Grades in Arithmetic

The second correlation was made between SRA subtest in arithmetic concepts and fourth grade teacher grades in arithmetic. This study yielded a moderate r_{tet} correlation of .60 with a standard error of .02. There is, therefore, indication of a relationship between grades awarded by the fourth grade arithmetic teachers and scores earned on the SRA achievement concepts subtest.

TABLE XI

A COMPARISON OF FOURTH GRADE TEACHER GRADES IN ARITHMETIC
WITH SRA NUMBER CONCEPT SCORES

SRA Arithmetic Concepts	Teacher Grades - Arithmetic		
	A or B	C or Below	Total
9.9-6.8	104	33	137
6.7-2.0	104	187	291
Total	208	220	428

Since the children in the sample studied were given the SRA Achievement test during the spring semester of each of the two years, expected scores would have been between 4.5 and 4.9 in accordance with national norms. In Henrico County, the mean score for the total SRA Achievement Test in the years 1962-64 was 5.6, and the median score was 5.5 as shown in Table XIV of the appendix. The scores fell well above the national norms and may indicate that area norms should be set at one grade level above the national norms.

In a specific study of the grade equivalent scores as given on the SRA Achievement Test in the area of Arithmetic Concepts, it was found that the Henrico County mean was 6.1 and the median was also 6.1 in the years 1962-64 as shown in Table XV of the appendix. This would indicate that children in Henrico County, in the years of the sample, were almost two years above the national norms.

Table XVI in the appendix showed that when specific scores were

studied in the area of reading comprehension, the Henrico County mean was found to be 5.4 and the median 5.2, which was about one year above the national norms.

SRA Achievement Test Versus Lorge-Thorndike Intelligence Test

The highest correlation obtained was between the total grade equivalent score of the SRA Achievement Test and the Lorge-Thorndike Intelligence Test. In this correlation the r_{tet} was .81 with a standard error of .01. This is a very high correlation and indicates that intelligence and achievement as indicated by these tests are closely related. This testing program should therefore provide valid information for use in sectioning elementary school students, for determining over achievers and under achievers and for pupil guidance.

TABLE XII

COMPARATIVE SCORES ON TOTAL SRA GRADE EQUIVALENT SCORES
AND LORGE-THORNDIKE INTELLIGENCE TEST
TOTAL INTELLIGENCE QUOTIENT

Total I.Q.	Total SRA Grade Equivalent Scores		
	9.9-6.8	6.7-2.0	Total
96 or above	83	285	368
95 or below	2	111	113
Total	85	396	481

When individual intelligence test scores were studied, it was found, as shown in the appendix Table XVII, that the mean I.Q. for the

sampled group was 104 and the median I.Q. was also found to be 104. This fact might serve as a partial explanation of the above average test scores earned by Henrico County pupils.

TABLE XIII
SUMMARY OF RELATIONSHIP OF TESTS STUDIED

Predictor	Criterion	r_{tet}	Standard Error
MRT-RR	SRA-RC	.47	.02
MRT-NR	SRA-AC	.49	.02
MRT-TR	SRA-TGE	.80	.02
MRT-TR	LT	.46	.02
MRT-RR	TGR	.36	.02
MRT-NR	TGA	.32	.02
SRA-RC	TGR	.59	.02
SRA-AC	TGA	.60	.02
SRA-TGE	LT	.81	.01

Note: r_{tet} and standard error were rounded off to two place coefficients.

Key: MRT - Metropolitan Readiness Test
 RR - Reading Readiness
 NR - Number Readiness
 TR - Total Readiness
 SRA - Science Research Associates Achievement Test
 RC - Reading Comprehension
 AC - Arithmetic Concepts
 TGE - Total Grade Equivalent
 LT - Lorge-Thorndike Intelligence Test Total Intelligence Quotient
 TGR - Fourth Grade Teacher Grades in Reading
 TGA - Fourth Grade Teacher Grades in Arithmetic

CHAPTER V

CONCLUSIONS

From the preceding data it would appear that the testing program of Henrico County is of value. This study indicated that the Metropolitan Readiness Test does have predictive value for the fourth grade in the areas of tested achievement and tested intelligence scores. The Metropolitan Readiness Test was proved to be an excellent predictor of fourth grade achievement when total readiness was compared with the SRA total grade equivalent. This study also indicated that the Metropolitan Readiness Test has a moderately low prediction for teacher evaluations of pupil progress at the fourth grade level.

The SRA Achievement Test scores were demonstrated to have a high correlation with intelligence test scores and moderately high correlation with teacher grades and should, therefore, be of value to school personnel.

It appears appropriate to the author that Henrico County determine area norms for the standardized tests used since these county norms are somewhat higher than those for the nation. Established area norms would make possible a more accurate interpretation of the scores as rendered by the test.

Greater care must be taken to enable teachers and administrators to give the most useful and meaningful interpretations to the scores rendered by these standardized tests.

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BIBLIOGRAPHY

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A P P E N D I X

TABLE XIV
 FREQUENCY DISTRIBUTION OF SRA TOTAL GRADE EQUIVALENTS
 AND PERCENTAGE OF SAMPLED SCORES
 FALLING AT EACH INTERVAL

Score Interval	f	% of Total
9.0-9.9	0	.00
8.0-8.9	11	2.29
7.0-7.9	55	11.43
6.0-6.9	105	21.83
5.0-5.9	163	33.89
4.0-4.9	107	22.25
3.0-3.9	39	8.11
2.0-2.9	1	.20

Median 5.5
 Mean 5.6

TABLE XV

FREQUENCY DISTRIBUTION OF SRA GRADE EQUIVALENT
 NUMBER CONCEPTS SCORES AND PERCENTAGE OF SCORES
 FALLING AT EACH INTERVAL

Score Interval	f	% of Total
9.0-9.9	5	1.04
8.0-8.9	38	7.90
7.0-7.9	109	22.66
6.0-6.9	109	22.66
5.0-5.9	114	23.70
4.0-4.9	72	14.97
3.0-3.9	25	5.20
2.0-2.9	9	1.87

Median 6.1
 Mean 6.1

TABLE XVI
 FREQUENCY DISTRIBUTION OF SRA GRADE EQUIVALENT
 READING COMPREHENSION SCORES AND PERCENTAGE
 OF SCORES FALLING AT EACH INTERVAL

Score Interval	f	% of Total
9.0-9.9	13	2.70
8.0-8.9	23	4.78
7.0-7.9	49	10.19
6.0-6.9	74	15.38
5.0-5.9	111	23.08
4.0-4.9	121	25.16
3.0-3.9	75	15.59
2.0-2.9	15	3.12

Median 5.2
 Mean 5.4

TABLE XVII

FREQUENCY DISTRIBUTION OF INTELLIGENCE QUOTIENTS
 AS YIELDED BY THE LORGE-THORNDIKE INTELLIGENCE
 TEST AND THE PERCENTAGE OF SCORES
 FALLING AT EACH INTERVAL

Score Interval	f	% of Total
130-139	7	1.45
120-129	49	10.18
110-119	103	21.46
100-109	164	34.04
90- 99	97	20.13
80- 89	53	11.09
70- 79	6	1.24
60- 69	2	.41

Median 104.53
 Mean 104.38

VITA

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