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Sex differences in achievement in arithmetic in grades five and seven

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SEX DIFFERENCES IN ACHIEVEMENT IN ARITHMETIC IN GRADES FIVE AND SEVEN

Submitted by

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CHAPTER I

INTRODUCTION

Up to the end of the nineteenth century and even in the beginning of the twentieth, it had been assumed that men and women differ in mentality.

The classical Greek writers mention many instances of the mental inferiority of women. Socrates[1/] speaking to his student Claudon said, "You are quite right, he (Socrates) replied, in maintaining the general inferiority of the female sex; although many women are in many things superior to many men, yet, on the whole, what you say is true."

This view has persisted throughout the centuries and even in our own day, wherever civilization has not yet reached a high stage of development, women are considered inferior to men. As a result, in most countries, educational systems are organized from the point of view of the needs of

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1/ B. Jowett, The Dialogues of Plato. New York: Random House, 1937 Vol. I, Republic V, p. 717.

the boys, while the girls are taught those subjects or "arts" which, by tradition, are suitable to females.

However, since standardized psychological and educational tests have been available, it has been possible to discover the fallacy of this reasoning.

The problem of sex differences in education has been one of the controversial subjects among psychologists and educators. The popular and traditional idea of regarding men more intelligent than women, the teachers' tendency to think that girls are superior to boys because of their better school work, induced many authorities to conduct studies and investigations on this subject.

During the past thirty years many experiments, investigations and studies have been done on the topic of sex differences in all elementary school subjects. These studies, however, are not unanimous in their conclusions. Although it is true that many have accepted the findings of these investigations, many others have cast doubt upon and have rebutted them.

A similar study on sex differences will be treated in this thesis. The purpose of it is to find out whether there are any sex differences in achievement in arithmetic among fifth and seventh grade pupils as measured by a standardized test. This study purports to add to the others

and give further suggestions for a thorough and complete study of the subject for determining some definite conclusions and advice in the teaching of arithmetic.

CHAPTER II

REVIEW OF RESEARCH

It has been recognized by all psychologists and educators that there exist some differences among boys and girls in their school achievement. These differences can not be attributed alone to intelligence.

Many authorities have indicated that the average intelligence-quotient among boys and girls is equal. St. John[1/] in a study of five hundred and three boys and four hundred and fifty-five girls indicated that the average intelligence-quotient is equal between the two sexes.

Terman[2/] also states that girls have a small but fairly constant superiority up to 13 years of age. But he adds, "The superiority of girls over boys is so slight (amounting at most ages at only 2 to 3 points in terms of I.Q.) that for practical purposes it would seem negligible."

1/ Charles W. St. John, Educational Achievement in Relation to Intelligence. Cambridge: Harvard University Press, 1930, p. 146.

2/ Lewis M. Treman, The Measurement of Intelligence. Boston: Houghton Mifflin Company, 1916, p. 70.

Despite this intelligence equality girls do show superiority in their school work and receive higher marks than boys. Many educators have studied this problem and offered some explanations.

Stroud and Lindquist,[1] for example, state that girls may experience something of a generalized feeling of inferiority and to overcome this obstacle they may unconsciously be striving to prove themselves either equal or superior to boys. Thus this seeking for compensation may contribute to some extent at least to their superior success in school work. "Feminine mores do not permit as much latitude in this regard as do those of the boys."

Again, Witty and Lehman,[2] considering this matter, believe that the male drives are more powerful than those of the female. Since in school both boys and girls must suppress certain of their desires, the loss resulting from school activities are probably less offensive than to boys. To some extent, at least, the willingness of the girls to accept restrained limitations in their behavior in school may explain their greater fondness for reading, since reading is an

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1/ J. B. Stroud and E. F. Lindquist, "Sex Differences in Achievement in the Elementary and Secondary Schools," The Journal of Educational Psychology, 33:657-667, Dec. 1942.

2/ Paul A. Witty and Harvey C. Lehman, "Some Suggestive Results Regarding Sex Differences in Attitude Toward School Work," Education, 49:449-458, Ap. 1929.

escape from the realism of every day life to the fanciful life of fiction.

Cannon[1] speaking of girls' proficiency in school work states, "Not only does society demand restrictions in the activity participation of the girl and make her more tractile, but the female of the species appears to be able to tolerate to a greater degree than the male the thwarting of impulses and desires. The observation is in accord with the results of certain experiments which show that the female is more amenable to repression than the male."

In an article published by Johnson[2] he refers to a study by Dr. Ayres[3] in 1909. Dr. Ayres claimed, "Our schools as they now exist are better fitted to the needs and natures of the girl than the boy pupils." Johnson in his article claims the same "for reasons that are identical only in part." He emphasizes the fact that boys are gradually retarded year by year from kindergarten up to college and that boys are graduating from high schools six months older

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1/ W. B. Cannon, Bodily Changes in Pain, Hunger, Fear and Rage. New York: D. Appleton Co., 1920, p. 14.

2/ George R. Johnson, "Girls Lead in Progress Through School," American School Board Journal, 95:25-26, Oct. 1937.

3/ Leonard P. Ayres, Laggards in Our Schools. Russell Sage Foundation, 1909, p. 158.

than girls, though starting at the same average age and with the same average ability.

Johnson attributes these facts to

a) social pressure to keep boys out of employment;

b) discipline symptoms of maladjustment;

c) feminine influence of teachers or over-feminization of schools.

After one year Johnson[1/] made another survey in which indicated that approximately two thirds of the upper half of every high school graduating class consisted of girls, while boys were superior in the standardized general achievement tests given to all graduates on the eve of their graduation. This discrepancy, according to the article, was due mainly to the rating which boys obtained in classes taught by women. Johnson, then, concluded, "Since boys have an intelligence-quotient equal to that of the girls according to tests, since they start to school at the same age, since their success in taking examinations is even better than that of girls, and since their low grades in class work are derived from classes taught by women, the survey concludes that school work in these classes is too feminine in

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1/ George R. Johnson, "Girls Do Better Than Boys in School," School and Society, 47:313-314, March 5, 1938.

kind and character to arouse the interest of boys and that consequently their daily performance is poor."

Book[1/] also gives practically the same reasons for this girls' superiority, in his book published in 1922. He emphasizes the fact that the school work is better adapted to the special interests and abilities of the girls and fails to reach and appeal to the needs and interests of the boys, and that girls may possess special mental abilities.

Day[2/] making a survey on sex differences in achieving honor ranks found that boys throughout their school career rank behind those of the girls and that the advantage of girls reaches its peak in high school.

The causes, according to this survey, have no relation to the mental abilities of the pupils, but to

a) lack of adaptability on the part of the boy. The boy, who is less mature than a girl of the same age, finds it harder to fit into the strange school situation.

b) lack of care about things. Boys are generally less conscientious about things. Many times,

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1/ William F. Book, The Intelligence of High School Seniors. New York: The Macmillan Company, 1922, p. 291.

2/ L. C. Day, "Boys and Girls and Honor Ranks," School Review, 46:288-299, Ap. 1938.

as they become older, they may look upon school work as a waste of time, especially of the courses are not contributing to their particular interests.

c) hopeless feeling of obtaining honors;

d) feministic education.

Schinnerer[1/] attributes higher failure among boys to the following reasons:

1) They are less mature than the girls.

2) They are less interested than the girls in the present academic curriculum and consequently they do not do as well as the girls.

3) Girls are more conscientious in doing their assigned work, especially their home work, than boys.

The more rapid physical and mental development of the girls during the school age is also a factor of their superior attainment in their school work.

Lewis,[2/] in a study of intelligence among inferior and superior children, is of the opinion that the female superiority is not an indication of inherent superiority of girls over boys in intelligence, but rather to the more rapid development of girls, which may be possibly as great as a year or a

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1/ Mark C. Schinnerer, "Failure Ratio: 2 Boys to 1 Girl," The Clearing House, 18:246-270, Jan. 1944.

2/ W. Dayton Lewis, "Sex Distribution of Intellige nce Among Inferior and Superior Children," Pedagogical Seminar y and Journal of Genetic Psychology, 67:67-75, September Quarterly, 1945.

year and a half. This would place more girls at the higher levels and more boys at the lower levels during the elementary school period.

Dearborn[1/] discussing this matter of girls' superiority over boys states, "Girls at the age of six are as far along in this phase of anatomical development as are boys of seven and one half years, and are, from school entrance until maturity, about eighteen months ahead of boys in the ratio of their yearly status to their final status or as now commonly expressed, in their anatomical indices. This being the case, and assuming, for the present, the equality of girls and boys in native endowment and training up to the time of their entrance in school, girls out to be superior to boys in both their school accomplishments and in intelligence as now tested. It is possible then for this reason that more girls hold higher levels and more boys lower levels during the elementary school period."

As far as arithmetic alone, investigations show that girls are superior in drill and counting ability, while bo ys tend to be superior in achievement in tests.

Although few studies in number concepts are available

1/ Walter Fenn Dearborn, Intelligence Tests. Boston: Houghton Mifflin Co., 1928, p. 129.

for the primary school grades, several studies indicate that girls are somewhat superior in their arithmetic abilities. Freeman[1/] attributes this girls' superior effeciency in ability to count and ability to solve problems as a matter of rote memory and ability to read and comprehend better.

Lund[2/] in an article on sex differences in mastery of several subjects states, "It is possible that the mastery of the girls is more verbal or rote and less logical than that of the boys. This is supported by the fact that purely rote and sensory-motor connections suffer more through lapse of time than do logical connections, and by the fact that the difference in loss is greater in those subjects in which purely linguistic mastery is inadequate. Interests and outlook of the girls being different, they are less motivated in the direction of logical mastery in many school subjects."

Perry[3/] in his experiment found that the girls reached

1/ Frank, S. Freeman, Individual Differences, New Y ork: Henry Holt and Co., 1934, p. 203.

2/ Frederick H. Lund, "Sex Differences in Type of Educational Mastery," The Journal of Educational Psychology, 23:321-330, May 1932.

3/ Winona M. Perry, "Are Boys Excelling Girls in Geometric Learning?" The Journal of Educational Psychology, 20:270-279, Ap. 1929.

a higher degree of achievement in geometry. He emphasized the fact that the girls were superior in responding to the "link" steps, being able to bridge the gap between the given relations and the required relations which had controlled the direction of the processes of thinking.

Pease[1/] in making a study on algebraic ability also found a slight superiority in favor of the girls.

Van Wagenen[2/] comparing both the achievement and the quality of work of fifty-two boys and forty-nine girls of sixth grade with mental age below eleven years three months, and thirty-nine boys and fifty-four girls of the same grade with mental ages of fourteen years three months and above, found superiority among girls.

Heilman[3/] made an investigation using as subjects ten-year old children attending forty-eight different public schools in Denver, Colorado. In this investigation the sexes

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1/ Glenn R. Pease, "Sex Differences in Algebraic Ability," The Journal of Educational Psychology, 21:712-14, Dec. 1930.

2/ M. J. Van Wagenen, "A Comparison of the Mental Ability and School Achievement of the Bright and Dull Pupils in the Sixth Grade of a Large School System," The Journal of Educational Psychology, 16:186-192, March 1925.

3/ J. D. Heilman, "Sex Differences in Intellectual Abilities," The Journal of Educational Psychology, 24:47-62, Jan. 1933.

were compared for their average standing in chronological age, the amount of training as measured by school attendance, social and economic factors, mental and educational ages, and achievement in a number of different school subjects.

In regard to arithmetic, he concluded, "In problem-solving the significance ratio for the difference between the means is 2.67 and for the difference between the medians it is 2.71. While these ratios are high there is still some chance that the true difference may be zero or in favor of the other sex, in this case the girls. The next highest significance ratio is 2.1. This was found for the difference between the means in arithmetical computation in which the girls excel."

The girls' superiority in problem comprehending may be attributed to their superiority in reading, with the result that the girls show greater progress in arithmetic.

Wilson[1/] finds in a study of silent reading that pupils make very different scores when they are subjected to tests which require ability to read problems in arithmetic from those that they make when reading some other subjects.

Lessenger[2/] conducted an experiment in which the pupils were given intensive training in reading. It was found that the pupils' gain in arithmetical computation were as great or

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1/ Estaline Wilson, "Increasing the Ability to Read Arithmetic Problems," The Elementary School Journal, 22:380-386, Jan. 1922.

greater than those in reading. The errors due to faulty reading disappeared as a result of training without any specific reference to arithmetic.

Despite this girls' superiority, boys reach higher levels of achievement in mathematical tests than girls of the same grade, age and mental ability.

One of the earliest investigations was made by Smith[3/] in 1895. He examined approximately twenty thousand examination papers in arithmetic, algebra and geometry. He found some differences favoring the boys, but these differences were not very significant.

A major study on sex differences in the arithmetic had been undertaken by Thorndike[4/] in 1914. The subjects were four thousand and five hundred pupils from grades six to nine inclusive. He reported that 61 per cent of the boys in a test reached or exceeded the median achievement of the girls of the same school grade. In another test he found that 58 per cent of the boys reached or exceeded the median achievement of the girls. Thorndike concluded, "The sex difference found is

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2/ W. E. Lessenger, "Reading Difficulties in Arithmetical Computation," Journal of Educational Research, 11:287-291, Ap. 1925.

3/ Eugene David Smith, "Sex in Mathematics," Educational Review, 10:84-88, June 1895.

4/ Edward L. Thorndike, "Measurements of Ability to Solve Arithmetical Problems," The Pedagogical Seminary, 21:495-503, Dec. 1914.

small in comparison with individual differences within either sex, but in comparison with the differences between one grade and the next it is considerable; for these also are small. Roughly the boys are about half as far ahead of the girls in the same grade as they are of the boys in the preceding grade."

Minnick[1/] compared the marks of one hundred fifty boys and two hundred forty-three girls made in the four years a t Bloomington, Indiana high school. The boys received slightly higher marks in mathematics than the boys in other subjects.

Results similar to these were found by Starch[2/] in 1916. He made a study of one hundred and twenty-nine pupils in grades IV, V, VI, and VII and found that 60 per cent of the boys reached or exceeded the median for the girls in arithmetic test given.

In another study Webb[3/] compared the achievement scores of four hundred and ten boys and three hundred and forty-nine girls obtained on the Webb Geometry Tests in Los Angeles, California. Boys were found superior to girls by amounts, not attributable to chance. Girls were found to be more variable in their achievement than boys.

1/ J.H. Minnick, "Comparative Study of the Mathematical Abilities of Boys and Girls," School Review, 23:73-84, Feb. 1915

2/ Daniel Starch, "A Scale for Measuring Ability in Arithmetic," The Journal of Educational Psychology, 7:213-222, Ap. 1922.

Butler[1/] studied the results obtained from test booklets given to 1656 pupils in the seventh, eighth, and ninth grades differing in size and type of organization. He examined the data of the intelligence-quotients for the 270 of these pupils. Butler found that the degree of mastery of the mathematica l concepts attained by boys was slightly greater and that the boys tended to increase their mastery of the concepts slightly more rapidly than the girls.

Another study was made by Lentz[2/] on school marks a nd Stanford Achievement Test scores obtained by two hundred and two boys and one hundred and eighty-eight girls. His data indicated that in three out of five grades, the scores made by the boys were superior to those made by the girls, whil e in school marks the boys did not surpass the girls in any grade.

Douglass[3/] made an investigation concerning data relative to the respective achievements of the boys and girls in high school mathematics. The investigation seems to indicate that boys reach higher levels of achievement in

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3/ Paul E. Webb, "A Study of Geometric Abilities Among Boys and Girls of Equal Mental Abilities," Journal of Educational Research, 15:256-262, Ap. 1922.

1/ C. H. Butler,"Mastery of Certain Methematical Concepts by Pupils at the Junior High School Level," Th e Mathematics Teacher, 25: 117-172, No. 3, 1932.

2/ Theo. R. Lentz, Jr., "Sex Differences in School Marks with Achievement Test Scores Constant, School and Society, 29:65-68, Jan. 12, 1929.

mathematics than the girls of the same age, grade and mental ability.

During the winter of 1935, Jordan[1/] examined the tests given to more than nineteen thousand seniors of the North Caroline high schools. This test was made up of seven different parts: literature, two different tests on readin g, English usage, mathematics, general science and American History.

He found that, on the whole, the boys were slightly ahead on the test. Boys surpassed girls in mathematics, science and history, while girls surpassed boys in their scores in English usage and reading. In mathematics only 35 per cent of the girls reached or exceeded the boys' median.

Miller[2/] made a study particularly concerned with the relative achievement of the boys and girls of the same chronological age. He administered the Stanford Achievement Test to

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4/ Harl R. Douglass, "Sex Differences in Secondary School Mathematics," The Mathematics Teacher, 30:21-22, No. 1, 1937.

1/ A. M. Jordan, "Sex Differences in Mental Traits," The High School Journal, 20: 254-261, Nov. 1937.

2/ William A. Miller, "Achievement Scores of Boys and Girls of the Same Chronological Ages," The Elementary School Journal, 32:676-680, May 1932.

five hundred and forty-one boys and four hundred and ninety one girls in grades two to eight inclusive in the elementary schools of Springfield, Illinois. Although the study showed no marked superiority in achievement on the part of either sex, the boys tended to prove superior to the girls.

Stroud and Lindquist[1/] gathered the data on sex differences in school achievement yield by the Iowa Every-Pupil High School Testing Program and the Iowa Every-Pupil Basic Skills Testing Program. In the latter, which was given to grades three to eight, the girls maintained a consistent and on t he whole, significant superiority over boys in the subject tested, except in arithmetic, where small insignificant differences favored the boys. On the other hand, in the former test, the superiority was in favor of the boys, except in algebra and reading comprehension, where small and no significant differences favored the girls.

In a test given to eighth grade pupils concerning the informational phase of arithmetic as it relates to an understanding of certain concepts found in the social usages of

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1/ J. B. Stroud and E. F. Lindquist, "Sex Difference in Achievement in the Elementary and Secondary Schools," The Journal of Educational Psychology, 33:657-667, Dec. 1942.

business arithmetic, Grossnickle[1/] indicated that the average performance of the boys was significantly greater than that of the girls.

Eells and Fox[2/] made a study in the California College Mental Educational Survey of over eleven thousand students in 47 Junior Colleges.

In order to determine whether any sex differences existed, they equalized the factor of high school preparation and the factor of age and found a distinct and significant superiority of men in every age level.

The conclusion, then, to be drawn from the foregoi ng citations is that, despite the girls superiority in making higher marks in school and furnishing a low percentage in failure, boys generally obtain better scores in mathematical tests than do girls of the same age and mental ability.

1/ Foster E. Grossnickle, "Concepts in Social Arithmetic for the Eighth Grade Level," Journal of Educational Research, 30:475-488, Mr. 1937.

2/ Walter Crosby Eells and Clement S. Fox, "Sex Differences in Mathematical Achievement of Junior College Students," The Journal of Educational Psychology, 23:381-386, May 1932.

CHAPTER III

PROCEDURE IN THE STUDY

Since it is a universally accepted fact that sex differences do exist among pupils of all grades from kindergarten to the upper levels of education, the writer has undertaken the task of determining whether sex differences in achievement in arithmetic exist among pupils in certain grades of all elementary schools of a big town. In order to fulfill this objective, the writer studied and statistically analyzed the results of an achievement test in arithmetic administered to about nine hundred elementary school pupils.

The scores in this study were separated according to sex and were statistically analyzed in order to determine whether or not the existing differences were significant.

The subjects of this study were all the pupils attending the fifth and seventh grades of all elementary schools of Brookline, Mass., a town near Boston.

There were 232 boys and 188 girls in the fifth grade and 242 boys and 236 girls in the seventh grade. From the above numbers, 4 boys and 5 girls from the fifth grade and 5 boys and 4 girls from the seventh grade were excluded because of their unrecorded intelligence-quotients. Hence, the study was made on 228 boys and 183 girls of the fifth grade and 237 boys and 232 girls of the seventh grade.

The students were enrolled in eight different scho ols under sixteen different teacher, as shown in the appendix.

The age range of the fifth grade boys was from 9 years 7 months to 13 years 8 months, while the age range of the fifth grade girls was from 9 years 2 months to 13 years 1 month. The age range of the seventh grade boys was from 10 years 8 months to 15 years 3 months, while the age range of the seventh grade girls was from 11 years to 15 years 4 months.

The intelligence-quotients of the fifth grade boys ranged from 71 to 142, while of the fifth grade girls ranged from 70 to 146; the intelligence-quotients of the boys of the seventh grade ranged from 73 to 148 and of the seventh grade girls from 81 to 138.

All the data on test achievement test scores, intelligence-quotients, and chronological ages which were used in this investigation were obtained from the records of the Department of Child Placement of Brookline, Mass., under t he direction of Dr. James R. Hobson.

The achievement tests were given by each class teacher and all scores were calculated and checked by trained clerks of this department. These tests were given on March 24-28,1947 to the fifth grades and on March 10-14, 1947 to the seventh grades, when the chronological ages of the subjects tested for the present study had also been recorded.

The intelligence group tests were administered by Dr. J. R. Hobson to all pupils when they were attending the

fifth grade, or, if they entered school later, upon their entrance in school. The results were scored and checked in the office of Child Placement by trained clerks.

Scores and measures derived from the group intelli gence tests were used as criteria of intelligence. The gr oup intelligence tests used were the Kuhlman-Anderson.

The Arithmetic achievement scores were from the Metropolitan Achievement Tests,[1/] Intermediate Battery-Part ial: Form C (Revised) for grades 4, 5 and 6 for the fifth grade pupils and the Metropolitan Achievement Tests, Advanced Battery-Partial: Form C (Revised) for grades 7 and 8 for the seventh grade pupils.

The Metropolitan Achievement Tests, Intermediate and Advanced Batteries contain six subtests: 1. Reading; 2. Vocabulary; 3. Arithmetic Fundamentals; 4. Arithmetic Problems; 5. English; and 6. Spelling.

The Arithmetic Fundamental test of the Intermediate Batter consists of 60 items in adding, subtracting, multiplying and dividing integers, fractions, decimals and calculation of percentages; while the Arithmetic Problem Test of the same batteries contains 40 mixed problems.

1/ Metropolitan Achievement Tests, Published by World Book Company, Yonkers-on-Hudson, New York and Chicago, Illinois, 1935.

The Arithmetic Fundamental Test of the Advanced Battery consists of 60 items in addition, subtraction, multiplication and division of integers, fractions, decimals, calculation of percentages, time, distance measurements and simple calculations in geometry and algebra. The arithmetic problem test of the same battery contains 40 mixed problems.

In both grades, the pupils represented a wide range in social, cultural and economic background.

The scores of the tests were first tabulated according to sex with chronological ages and Kuhlman-Anderson i ntelligence quotients.[1/] After comparing the scores of the two sexes without taking in consideration their intelligence and age, each of the two grade groups was separated in three smaller groups on the basis of intelligence. This provided a meaningful number of cases in each group. The intelligence-quotient ranges of the groups chosen were as follows: pupils with I.Q. 120 and above formed the first group; pupils with I.Q. 100 to 119 the second group; and pupils with I.Q. 99 and below the third group.

It was necessary to choose a method of comparison which would show the difference between the groups and whether or not the differences were due to chance or represented a true difference.

1/ See appendix

The statistical meaningful way in which to describe the difference between two unselected groups is to determine the critical ratio from the differences of the means.

The ratio has been described by James E. Wert as follows:

> "In many cases a comparison is desired of the means of two samples from a given population. For, example, a first example may give a mean value of 72 and a second sample a mean value of 74. A difference of two points is noticed between these means. The difference between two means will fluctuate in successive samples; and, consequently, the difference of two means has a standard error of its own called the standard error of a difference between two means. When the difference between these two means is divided by standard error of the difference, a ratio is found which is sometimes called the critical ratio. Whenever this ratio is unity, the chances are 68 in 100 that the difference is too great to be the result of sampling fluctuations; whenever this ratio is two, the chances are 95 in 100 that the difference is too great to be the result of sampling fluctuations; and, whenever the ratio is three or more, it is a practical certainty that the difference is too great to be the result of sampling fluctuations."

The formula used in this study is $CR = \frac{M_1 - M_2}{SE\ Diff\ M_1M_2}$

1/ James E. Wert, Educational Statistics, New York: McGraw-Hill Book Company, Inc. p. 145

CHAPTER IV

ANALYSIS OF DATA

Chronological age measures are given in Table I. The mean age of the boys is greater than that of the girls, but this difference is not so large as to be significant. To determine whether the age factor affected the scores to any appreciable degree, the ages of the subjects, expressed in months, were correlated with the scores. The resulting correlation approximated zero.

Table II shows the distribution of intelligence-quotients. In the fifth grade the mean difference of I.Q. was 3.4 points and in the seventh grade 3.5 points in favor of the girls in both grades. This might be due to the type of Kuhlman-Anderson Intelligence Tests. Dr. Hosbon[1/] states "The point should be made in passing, that girls probably s showed a higher mean IQ on the Kuhlman-Anderson Tests because these tests are more heavily weighted with primary factors in which the girls are superior, namely, N, W, and R, than with V and S in which the boys are Superior. In fact, analysis of the Kuhlman-Anderson Test at these levels would, in the

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1/ James R. Hobson, "Sex Differences in Primary Mental Abilities," Journal of Educational Research, 41: 126-133, Oct. 1947.

TABLE I

SEX DISTRIBUTION OF AGES IN GRADES FIVE AND SEVEN

Ages in months	Grade 5		Grade 7	
	Boys	Girls	Boys	Girls
180 - 185			4	4
174 - 179			8	1
168 - 173			13	4
162 - 167	1	1	12	5
156 - 161	1	2	20	26
150 - 155	3	1	71	77
144 - 149	12	3	88	85
138 - 143	14	9	21	27
132- 137	33	24		3
126 - 131	75	56		
120 - 125	67	62		
114 - 119	22	23		
108 - 113		2		
Total	228	183	237	232
Mean	128.74	127.12	152.62	150.58
S.D.	8.53	8.4	8.58	7.80
SE_m	.56	.62	.55	.51
Diff.	1.62		2.04	
SE Diff.	.83		.75	
CR	1.95		2.72	

TABLE II

SEX DISTRIBUTION OF INTELLIGENCE-QUOTIENTS IN GRADES FIVE AND SEVEN

I. Q.	Grade 5		Grade 7	
	Boys	Girls	Boys	Girls
140 - 149	1	2	1	
130 - 139	9	4	4	9
120 - 129	19	32	24	33
110- 119	62	57	64	77
100 - 109	71	49	77	66
90 - 99	40	27	42	36
80 - 89	20	9	20	11
70 - 79	6	3	5	
Total	228	183	237	232
Mean	105.9	109.3	105.8	109.3
S.D.	13.46	14.52	12.71	13.5
SE_m	.89	1.07	.82	.88
Diff	3.4		3.5	
SE Diff	1.38		1.2	
CR	2.46		2.91	

opinion of the writer, reveal that S and M factors are not sampled at all as these factors are measured in the Chicago Tests."

Tables III and IV show the sex distribution in computation and Reasoning in both grades. The range of both sexes in both courses is almost the same, while the distribu-

tion of the subjects is not identical, more boys being in the upper score intervals. The boys show superiority to the girls, the difference being greater in Reasoning in grade seven where the difference is statistically significant. The seventh grade boys' superiority in both Computation and Reasoning is greater than that of the fifth grade boys. This shows that boys, as they become older, tend to surpass girls considerably.

Table V shows the statistical analysis of the four groups of grade five in computation.

In the analysis of the Computation scores of all pupils in grade five, the difference between the mean of the boys, 39.37, and the mean of the girls, 39.45, is .08. The critical ratio is .14 which, though insignificant favors the girls.

In the analysis of Computation scores for pupils in grade five with an IQ of 120 and above the difference between 42.95, the mean of the boys, and 42.59, the mean of the girls, is .66. The critical ratio, in favor of the boys, is 1.40, which means that the chances are 93 and above out of 100 that the difference is too great to be the result of sampling fluctuations.

In the analysis of Computation scores for pupils in grade five with an IQ of 99 and below, the difference between 35.09, the mean for the boys, and 35.39, the mean for the

TABLE III

SEX DISTRIBUTION OF SCORES IN ARITHMETIC COMPUTATION AND REASONING IN GRADE FIVE

Scores	Computation		Reasoning	
	Boys	Girls	Boys	Girls
63 - 65			1	1
60 - 62			4	1
57 - 59			4	0
54 - 56			9	4
51 - 53	2	2	8	6
48 - 50	18	14	17	13
45 - 47	21	12	39	27
42 - 44	42	42	50	35
39 - 41	52	32	9	18
36 - 38	34	31	33	22
33 - 35	25	27	20	19
30 - 32	28	21	16	18
27 - 29	4	1	6	10
24 - 26	2	1	8	5
21 - 23			3	3
18 - 20			1	1
Total	228	183	228	183
Mean	39.37	39.45	41.96	40.34
S.D.	5.64	5.43	8.22	7.89
SE_m	.37	.4	.54	.58
Diff.	.08		1.62	
SE Diff.	.54		.79	
CR	.14		2.05	

TABLE IV

SEX DISTRIBUTION OF SCORES IN ARITHMETIC COMPUTATION AND REASONING IN GRADE SEVEN

Scores	Computation		Reasoning	
	Boys	Girls	Boys	Girls
83 - 85	2	0	3	0
80 - 82	5	4	2	1
77 - 79	9	4	6	5
74 - 76	15	6	22	10
71 - 73	25	24	21	17
68 - 70	28	21	22	20
65 - 67	23	18	52	52
62 - 64	28	36	32	27
59 - 61	29	34	18	18
56 - 58	26	29	16	14
53 - 55	9	24	13	17
50 - 52	15	16	4	17
47 - 49	11	7	8	14
44 - 46	5	7	14	9
41 - 43	4	1	2	8
38 - 40	2	1	1	3
35 - 37	1		1	0
Total	237	232	237	232
Mean	62.97	61.76	64.10	61.19
S.D.	9.75	8.13	6.63	8.4
SE_m	.63	.53	.43	.55
Diff.	1.21		2.91	
SE Diff.	.82		.69	
CR	1.35		4.21	

girls, is .30. The critical ratio is .31 which, though insignificant, favors the girls.

Table VI shows the statistical analysis of the four groups of grade five in Reasoning.

In the analysis of the Reasoning scores of all pupils in grade five, the difference between the mean of the boys, 41.96, and the mean of the girls, 40.34, is .62. The critical ratio is 2.05 which means that the chances 95 out of 100 that the difference is too great to be the result of sampling fluctuations and in favor of the boys.

In the Analysis of Reasoning scores for pupils in grade five with an IQ 120 and above, the difference between 47.93, the mean of the boys, and 45.98, the mean of the girls, is 1.95. The critical ratio is 1.04 in favor of the boys, which means that the chances are 70 out of 100 that the difference is too great to be the result of fluctuations.

In the analysis of the Reasoning scores in grade five for pupils having IQ 100 to 119, the difference between 43 .76, the mean for the boys, and 40.85, the mean for the girls, is 2.91. The critical ratio 3.23, which is in favor of the boys, means that the difference is statistically significant.

In the analysis of the Reasoning scores for pupils in grade five with an IQ 99 points and below, the difference between 35.75, the mean of the boys and 33.47, the of the girls, is 2.28. The critical ratio in favor of the boys, is

TABLE V

STATISTICAL ANALYSIS OF SEX DIFFERENCES IN

ARITHMETIC COMPUTATION IN GRADE FIVE

Sex	No	K-A IQ	Mean	S.D.	SE_m	Diff.	SE Diff	CR
Boys	228	All	39.37	5.64	.37	.08	.54	.14
Girls	183	All	39.45	5.43	.40			
Boys	29	120 ab.	42.95	5.07	.94	.36	1.23	.29
Girls	38	120 ab.	42.59	4.98	.80			
Boys	133	100-119	40.55	5.07	.44	.93	.66	1.40
Girls	106	100-119	39.62	5.19	.50			
Boys	66	99 bel.	35.09	5.37	.66			
Girls	39	99 bel.	35.39	4.44	.71	.30	.96	.31

1.9 which means that the chances are 94 out of 100 that the difference is too great to be the result of sampling fluctuations.

In grade five boys are superior in Reasoning, while the girls are superior in Computation. This girls' superiority is very small so we may say that girls and boys are equal in Computation.

Table VIII shows the statistical analysis of the f our groups in grade seven in Computation.

TABLE VI

STATISTICAL ANALYSIS OF SEX DIFFERENCES IN ARITHMETIC REASONING IN GRADE FIVE

Sex	No	K-A IQ	Mean	S.D.	SE_m	Diff.	SE Diff	CR
Boys	228	All	41.96	8.22	.54	1.62	.79	2.05
Girls	183	All	40.34	7.89	.58			
Boys	29	120 Ab.	47.93	8.37	1.55	1.95	1.86	1.04
Girls	38	120 Ab.	45.98	6.39	1.03			
Boys	133	100-119	43.76	6.75	.58	2.91	.90	3.23
Girls	106	100-119	40.85	7.29	.70			
Boys	66	99 bel.	35-75	7.02	.86	2.28	1.20	1.9
Girls	39	99 bel.	33.47	5.34	.85			

In the analysis of the computation scores of all pupils in grade seven, the difference between the mean of the boys, 62.97, and the mean of the girls, 61.76, is 1.21. The critical ratio, in favor of the boys, is 1.35 which means that the chances are over 82 out of 100 that the difference is too great to be the result of sampling fluctuations.

In the analysis of computation scores for pupils in grade seven with an IQ 120 points and above, the differenc e between 71.91 and 67.47, respectively the means of the boys

TABLE VII

STATISTICAL ANALYSIS OF SEX DIFFERENCES IN ARITHMETIC COMPUTATION IN GRADE SEVEN

Sex	No	K-A IQ	Mean	S.D.	SE_m	Diff.	SE_{Diff}	CR
Boys	237	All	62.97	9.75	.63	1.21	.82	1.35
Girls	232	All	61.76	8.13	.53			
Boys	29	120 Ab.	71.91	6.12	1.13	4.44	1.66	2.67
Girls	41	120 Ab.	67.47	7.83	1.22			
Boys	141	100-119	64.2	8.73	.73	4.16	.96	4.33
Girls	144	100-119	60.04	7.59	.63			
Boys	67	99 bel.	56.43	8.1	.98	.87	1.44	.14
Girls	39	99 bel.	55.56	7.29	1.06			

and girls, is 4.44. The critical ratio in favor of the boys is 2.67 which shows that there is almost practical certainty that the difference is too great to be the result of sample fluctuations.

In the analysis of the computation scores in grade seven for pupils who have an IQ from 100 to 119, the difference between 64.2 and 60.04, respectively the means of boys and girls, is 4.16. The critical ratio in favor of the boys is 4.33 which means that there is practical certainty that the difference is too great to be the result of sampling fluctuations.

TABLE VIII

STATISTICAL ANALYSIS OF SEX DIFFERENCES IN ARITHMETIC REASONING IN GRADE SEVEN

Sex	No	K-A IQ	Mean	S.D.	SE_m	Diff.	SE Diff	CR
Boys	237	All	64.10	6.63	.43	2.91	.69	4.21
Girls	232	All	61.19	8.4	.55			
Boys	29	120 ab.	70.47	7.11	1.32	3.27	1.63	2.0
Girls	41	120 ab.	67.2	6.21	.97			
Boys	141	100-119	65.34	7.74	.65	5.75	.9	6.4
Girls	144	100-119	59.59	8.25	.68			
Boys	67	99 bel.	57.06	9.21	1.12	5.69	1.77	3.21
Girls	39	99 bel.	51.37	9.51	1.38			

In the analysis of the computation scores for pupi ls in grade seven with an IQ 99 points and below, the difference between 56.43, the mean of the boys, and 55.56, the mean o f the girls, is .87. The critical ratio is .14 which, though insignificant favors the boys.

Table IX shows the statistical analysis of the data of the four groups in Reasoning in grade seven.

In the analysis of the Reasoning scores of all pupils in grade seven, the difference between 64.10 and 61.19,

respectively the means of the boys and girls, is 2.91. The critical ratio, favoring the boys, is 4.21 which means the re is practical certainty that the difference is too great to be the result of sampling fluctuations.

In the analysis of the Reasoning scores for pupils in grade seven, with an IQ 120 points and above, the difference between 70.47 and 67.2, respectively the means of boys and girls, is 3.27. The critical ratio in favor of the boys is 2.0 which means the chances are 95 out of 100 that the difference is too great to be the result of sampling fluctuations.

In the analysis of the Reasoning scores for p upils in grade seven, with an IQ from 100 to 119 points, the difference between 65.34 and 59.59, respectively the means of boys and girls, is 5.75. The critical ratio, favoring the boys, is 6.4 which means that there is practical certainty that the difference is too great to be the result of sampling fluctuations.

In the analysis of the Reasoning scores for pupils in grade seven, with an IQ 99 points and below, the difference between 57.06 and 51.37, respectively the means of boys and girls, is 5.69. The critical ratio, favoring the boys, is 3.21 which means there is practical certainty that the difference is too great to be the result of sampling fluctuations.

In grade seven the boys are significantly superior to the girls. The difference in computation is slightly significant in favor of the boys, while the difference in Reasoning is statistically significant, in favor also of t he boys.

CHAPTER V

CONCLUSIONS

The purpose of this study was to find out whether there exist any sex differences in achievement in Arithmetical Computation and Reasoning in grades five and seven as measured by a standardized test. The pupils of grades five and seven of Brookline, Massachusetts public schools were selected because they offered an adequate number of cases for study, and the Metropolitan Achievement Test results and the Kuhlman-Anderson Intelligence Test scores for these pupils were available for analysis.

The writer of this investigation wishes to emphasize the point that the study was quite limited being restricted to two grades in one town but used all pupils on thos grade levels.

The following conclusions appear to be supported by the data presented.

1. Boys are older than girls in both grades, this age difference becoming greater in the seventh grade.
2. There is a slight difference of 3.5 points in I.Q. in favor of the girls. The boys are slightl y more variable than the girls in I.Q.

3. There is almost no sex difference in Arithmetic Computation in grade five. Results, according to the four I.Q. groups, are the following:

   a) For all pupils the critical ratio is .14 which, though insignificant, favors the girls.

   b) For pupils with an I.Q. of 120 points and above the critical ratio is .29 which, though insignificant, favors the boys.

   c) For pupils with an I.Q. 100 to 119 points the critical ratio, favoring the boys, is 1.40 which means that the chances are 93 out of 100 that the difference is too great to be the result of sampling fluctuations.

   d) For pupils with an I.Q. 99 points and below the critical ratio is .31 which, though insignificant, favors the girls.

4. Sex differences in favor of the boys not great enough to have statistical significance are found in Arithmetic Reasoning in grade five. Results, according to the four I.Q. groups, are the following:

   a) For all pupils the critical ratio is 2.05 which means that the difference is too great to be the result of sampling fluctuations and in favor of the boys.

b) For pupils with an I.Q. 120 points and above th e critical ratio, in favor of the boys, is 1.04 which means that the chances are 70 out of 100 that the difference is too great to be the result of sampling fluctuations.

c) For pupils with an I.Q. 100 to 119 points the critical ratio, in favor of the boys, is 3.23 which means that the difference is statistically sig nificant.

d) For pupils with an I.Q. 99 points and below the critical ratio is 1.9, in favor of the b oys, which means that the chances are 94 out of 100 that the difference is too great to be the result of sampling fluctuations.

5. Sex differences in favor of the boys not great enough to have statistical significance are found in Arithmetic Computation in grade seven. Results, according to the four I.Q. groups, are the following:

a) For all pupils the critical ratio, in favor of the boys, is 1.35 which means that the chances are 82 out of 100 that the difference is too gre at to be the result of sampling fluctuations.

b) For pupils with an I.Q. 120 points and above the critical ratio in favor of the boys is 2.67 which shows that there is almost practical certainty that

the difference is too great to be the result of sampling fluctuations.

c) For pupils with an I.Q. 100 to 129 points the critical ratio in favor of the boys is 4.33 which means that there is practical certainty that the difference is too great to be the result of sampling fluctuations.

d) For pupils with an I.Q. 99 points and below the critical ratio is .14 which, though insignificant, favors the boys.

6. Sex differences in measures in achievement i n Arithmetic Reasoning in grade seven are found in favor of the boys with a critical ratio which shows the difference to be statistically significant. Results for the four I.Q. groups are the following:

a) For all pupils the critical ratio, favoring the boys, is 4.21 which shows the difference to be statistically significant.

b) For pupils with an I.Q. 120 points and above the critical ratio, in favor of the boys, is 2.0 which means that the chances are 95 out of 100 that the difference is too great to be the result of sampling fluctuations.

c) For pupils with an I.Q. 100 to 129 points the critical ratio, favoring the boys, is 6.4 whi ch shows that the difference is statistically significant.

d) For pupils with an I.Q. 99 points and below the critical ratio, favoring the boys, is 3.21 which means that there is practical certainty that the difference is too great to be the result of sampling fluctuations.

7. The superiority of the boys over the girls in both subjects tend to become greater in the succeeding grades.

Suggestions for further studies.

The study indicates the importance of continued research upon similar educational problems.

1. Make a complete study of sex differences in arithmetic of all elementary school grades in two or three big cities.
2. Find out which factors contribute to the achi evement test superiority of the boys, though they are inferior to the girls in intelligence and school work.

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APPENDIX

Individual Pupil Data for Grade Five from

the Cover of the Metropolitan Achievement Tests

Baker School - I

Boys				Girls			
Comp.	Reas.	K.A. IQ	Age	Comp.	Reas.	K.A. IQ	Age
44	49	135	10-5	35	40	118	10-3
28	34	113	10-3	33	30	110	10-7
37	37	121	9-10	33	28	84	12-0
45	63	130	10-8	30	32	112	10-2
53	38	106	10-0	37	43	108	10-2
31	29	92	11-0	32	23	119	10-0
36	32	92	11-11	35	2[illegible]	111	10-3
43	47	118	10-3	32	20	105	10-8
48	47	116	10-7	47	46	122	10-2
45	43	115	10-11	32	34	121	9-2
40	42	117	10-10	31	32	120	9-10
30	24	83	11-5				
31	34	99	10-8				
41	54	105	10-10				
32	32	107	10-7				
36	38	117	10-6				
38	46	-	10-0				
32	32	91	10-0				

Baker School - II

39	43	97	10-10	35	37	104	9-10
43	52	113	11-11	31	32	120	9-5
33	37	116	10-6	33	37	113	10-4
37	46	108	11-0	38	40	113	11-0
37	36	124	10-0	40	49	125	10-10
33	38	101	10-10	43	42	124	10-4
36	32	94	10-3	38	40	119	9-10
48	57	131	10-9	38	43	119	9-9
39	43	119	10-0	34	38	120	9-9
42	50	115	9-11	37	35	109	10-10
41	44	105	10-7				
31	43	100	10-3				
37	35	122	10-0				
31	19	106	9-9				
48							

Boys				Girls			
Comp.	Reas.	K.A. IQ	Age	Comp.	Reas.	K.A. IQ	Age
			Baker School - II (cont.)				
48	54	115	10-9				
41	52	116	10-8				
40	43	122	10-9				
			Devotion School - I				
41	50	121	10-1	32	26	99	10-0
41	44	121	10-2	43	50	122	10-3
44	44	115	10-10	41	38	108	10-2
45	47	104	10-4	30	29	85	12-2
40	34	113	10-5	32	30	-	10-10
47	46	116	10-9	49	44	106	10-10
48	52	111	10-4	42	42	120	9-9
42	54	116	10-1	47	46	122	10-0
48	55	101	9-11	48	49	112	10-9
41	49	125	10-3	40	47	122	10-2
42	47	114	11-1	49	52	134	9-8
35	30	116	10-2	39	37	98	10-4
				34	35	96	11-2
				39	29	105	10-7
				42	42	-	10-6
				42	44	100	10-11
			Devotion School - II				
31	30	103	11-8	33	35	89	11-3
39	35	100	9-8	35	35	120	10-7
37	37	102	11-2				
36	38	80	11-8				
41	43	106	9-10				
25	23	-	11-8				
41	38	99	10-4				
29	22	93	10-9				
36	43	115	10-1				
32	34	-	10-3				
31	26	104	10-0				
41	43	119	9-11				
30	28	83	11-10				
41	42	102	10-9				
45	49	94	11-9				
30	34	107	10-2				
37	34	110	11-0				
41	50	86	11-5				

Boys					Girls				
Comp.	Reas.	K.A.	IQ	Age	Comp.	Reas.	K.A.	IQ	Age
				Devotion School - III					
37	46		117	10-2	37	44		109	10-6
42	47		119	10-5	36	37		102	10-10
32	37		113	9-11	43	46		120	9-10
42	49		118	10-3	36	34		117	10-1
38	43		110	10-0	42	47		120	10-3
39	37		102	10-7	41	43		107	10-7
39	40		105	10-5	36	40		115	10-3
53	47		105	10-4	39	43		112	9-11
52	62		126	10-7	40	37		116	10-6
40	38		101	10-8	48	54		130	9-9
39	46		135	9-9	45	50		126	10-5
37	46		116	10-1	38	43		108	11-0
					35	42		122	10-2
					42	49		105	11-2
					36	40		106	10-7
					40	43		112	10-5
				Driscoll School - I					
45	46		110	10-5	43	43		113	10-4
39	34		108	10-10	44	40		104	10-9
44	59		101	10-11	38	43		101	10-7
41	37		128	9-7	43	43		120	10-5
37	40		115	10-6	37	46		124	10-4
43	50		109	11-4	38	43		105	11-0
39	29		94	10-7	45	55		127	10-3
43	40		98	11-0	37	46		110	10-6
37	38		109	10-3					
37	38		105	10-5					
33	43		109	10-2					
42	38		104	10-6					
47	46		130	10-2					
39	37		98	10-5					
43	50		117	9-11					
40	44		114	10-4					
42	40		112	10-3					
38	40		103	10-6					
37	44		118	10-9					
48	54		119	10-11					
				Driscoll Schhol - II					
49	46		105	10-8	48	43		120	10-0
40	46		108	10-6	48	37		-	10-7

Boys				Girls			
Comp.	Reas.	M.A.	IQ	Age	Comp.	Reas.	M.A.	IQ	Age
				Driscoll School - II (cont.)					
43	47		111	10-10	48	52		119	10-7
44	42		106	10-10	48	50		136	10-1
45	44		105	10-7	35	35		91	11-5
47	57		103	10-3	41	40		102	10-11
39	42		101	10-6	44	46		114	10-2
44	43		122	10-10	49	46		104	10-9
50	52		115	10-8	49	52		144	9-7
45	50		108	11-1	44	49		122	10-2
45	46		107	10-8	38	35		107	10-4
					47	40		105	10-10
					39	37		109	10-3
					48	54		115	10-7
				Heath School - I					
32	35		90	11-5	42	38		101	11-1
42	49		142	10-0	32	30		97	12-2
40	43		85	11-2	37	37		94	10-10
32	26		96	10-7	45	40		111	10-3
34	24		97	10-0	42	37		101	10-7
39	42		109	10-0	41	38		83	12-10
36	42		93	11-1	33	24		71	13-0
34	32		81	12-1	51	46		117	10-5
40	32		91	11-0	40	34		103	11-0
33	43		94	11-2	41	29		92	10-3
40	47		102	10-4	36	30		117	10-0
49	52		114	10-3	44	32		99	10-6
					44	49		119	10-6
				Lincoln School - I					
43	46		101	10-6	47	46		107	11-3
41	38		117	10-11	37	40		87	11-8
44	44		101	10-0	31	28		88	11-11
42	38		97	11-0	42	40		103	11-4
40	37		87	11-4	37	30		96	9-11
42	38		100	11-5	35	30		93	11-2
43	34		95	11-11	37	37		99	11-4
43	46		71	13-8	41	34		84	11-5
40	44		100	11-4	40	24		89	11-4
36	26		88	10-10	39	34		92	11-3
39	34		88	12-3					
39	34		81	12-3					
35	34		94	10-9					

Boys					Girls				
Comp.	Reas.	K.A.	IQ	Age	Comp.	Reas.	K.A.	IQ	Age
				Lincoln School - I (cont.)					
48	47		83	10-4					
30	34		76	12-9					
45	46		105	11-5					
30	24		88	11-1					
				Lincoln School - II					
31	32		90	11-8	33	34		92	10-7
30	32		97	10-10	34	34		99	11-6
39	37		98	12-3	25	23		70	13-1
36	34		95	10-5	37	37		106	10-7
36	32		108	9-10	36	35		92	11-1
34	32		123	10-1	35	32		95	9-11
30	32		77	12-0	38	44		114	10-6
39	32		97	11-1	37	42		100	11-3
36	40		109	10-7	30	29		97	10-8
33	35		87	12-3	32	32		105	10-7
30	40		79	12-4	30	24		107	10-11
39	42		92	11-0	36	32		-	10-5
30	37		97	10-7	38	37		98	10-10
29	26		93	11-3					
24	23		85	12-5					
29	26		112	10-1					
				Lawrence School - I					
40	46		110	10-0	33	30		93	10-10
36	42		101	10-6	43	37		95	10-4
44	46		132	10-0	41	25		80	11-5
45	54		109	11-0	38	20		113	10-3
45	46		113	10-6	43	46		133	10-5
49	62		131	10-3	43	40		129	9-11
40	38		100	10-4	43	43		117	10-1
40	46		111	10-4	43	43		109	11-0
					45	42		118	10-0
					43	46		117	9-11
					43	41		108	10-11
					44	37		117	10-6
					41	46		104	10-8
					40	42		110	10-6
					39	40		106	10-11
				Lawrence School - II					
32	34		88	11-1	35	37		105	10-8

Boys				Girls			
Comp.	Reas.	K.A. IQ	Age	Comp.	Reas.	K.A. IQ	Age
			Lawrence School - II (cont.)				
38	35	114	9-9	43	46	112	10-7
48	38	113	10-3	42	43	121	10-4
41	44	117	9-11	40	40	116	10-9
38	46	118	9-11	41	54	121	10-8
47	62	122	9-9	30	37	94	11-0
33	30	96	11-4	30	28	105	10-0
38	38	106	10-9	44	47	117	10-5
35	42	102	10-6	40	37	112	9-11
36	37	101	10-10	39	42	119	9-10
				42	44	111	10-11
				35	50	111	10-6
				39	46	120	11-6
				39	37	104	10-0
				36	43	113	9-11
			Pierce School -I				
43	29	85	12-1	44	49	110	10-5
35	42	83	12-7	32	30	108	10-2
30	37	90	11-10	34	29	97	11-0
47	49	111	10-9	32	43	79	11-11
34	42	106	10-10	38	50	113	10-2
34	40	72	13-4	30	34	110	10-5
26	22	97	10-3	34	32	114	10-3
40	49	110	10-6	35	38	98	11-6
35	46	115	10-7	35-	30	105	10-5
32	42	73	12-5	44	52	101	10-11
			Pierce School - II				
33	40	101	11-3	32	34	107	11-3
44	57	100	11-1	33	49	118	10-3
42	46	125	10-4	32	40	93	11-8
40	46	100	11-7	32	32	97	11-9
35	42	109	10-8	28	26	109	10-0
31	29	87	12-9	37	32	104	10-11
30	29	90	12-1				
35	38	109	10-7				
35	43	98	10-11				
30	38	84	11-10				
33	37	102	11-5				
38	43	111	10-10				

Boys					Girls				
Comp.	Reas.	K.A.	IQ	Age	Comp.	Reas.	K.A.	IQ	Age
				Runkle School - I					
49	49		110	11-0	36	35		-	11-0
43	46		117	9-8	49	52		114	10-11
42	37		103	11-1	37	29		107	10-1
43	43		105	10-10	39	43		98	11-3
39	38		97	11-11	52	63		146	9-6
36	43		94	11-8	44	60		115	10-5
40	43		98	10-5	42	46		115	9-10
43	42		97	10-11	41	34		95	14-11
33	50		101	10-3	44	50		110	10-4
48	43		98	11-6	48	46		115	10-3
48	60		134	9-9	40	30		111	10-3
39	35		105	10-8	43	47		116	9-9
37	43		101	10-9	47	43		102	10-10
38	32		104	10-11	47	47		110	11-1
42	47		116	9-10	43	46		121	10-11
49	46		120	10-5					
42	47		120	9-10					
44	43		117	9-10					
				Runkle School - II					
40	46		125	10-1	40	40		120	10-0
43	55		112	10-8	44	52		125	10-10
44	42		109	10-4	47	46		109	10-10
32	47		106	10-10	35	43		119	9-9
39	35		102	10-0	42	44		104	10-11
42	46		120	11-0	47	43		118	10-4
49	52		118	10-7	48	47		122	9-7
41	38		124	9-11	44	46		121	10-0
42	50		112	10-6	41	35		112	10-8
47	47		111	10-3	44	46		114	10-1
41	54		123	10-2	33	40		103	10-10
44	42		109	9-9	48	40		122	10-2
47	52		114	10-8	43	47		120	10-4
44	49		105	10-8	44	42		113	10-7
33	43		99	12-1					
40	46		114	10-2					
45	52		107	10-1					
41	43		96	10-11					
50	54		132	10-5					
45	44		105	10-6					
35	43		110	10-7					

Individual Pupil Data for Grade Seven from

the Cover of the Metropolitan Achievement Tests

Baker School - I

Boys					Girls				
Comp.	Reas.	K.A.	IQ	Age	Comp.	Reas.	K.A.	IQ	Age
70	65	105		12-6	68	66		97	12-10
67	65	113		12-9	71	70		125	11-11
59	65	110		12-0	64	67		121	12-2
53	52	107		11-8	55	55		125	12-0
69	70	115		12-10	58	55		-	12-10
69	76	102		12-10	72	76		117	12-4
73	78	127		12-11	76	66		114	12-6
60	70	106		11-10	62	59		105	12-8
51	46	80		14-1	49	40		91	12-2
73	76	129		11-8	75	75		125	11-9
69	75	96		12-8	72	70		103	12-3
73	70	113		12-6	54	57		111	12-8
60	64	111		12-3	72	75		116	12-10
71	83	148		11-10	56	66		103	12-11
52	64	98		13-1	64	67		129	12-11
64	67	116		12-5	61	64		105	12-8
67	75	107		12-7					

Baker School - II

56	65	114		12-3	53	59		122	12-2
63	70	102		12-1	45	52		97	12-11
66	66	117		12-7	52	47		97	13-0
70	75	115		11-0	54	66		123	12-5
62	70	101		12-7	55	40		102	12-6
64	64	98		12-6	50	52		114	11-10
67	57	117		12-3	53	52		102	12-2
75	86	114		13-7	72	76		112	12-10
66	67	95		12-9	62	57		113	12-1
64	68	107		12-3	52	46		99	13-11
67	65	-		12-6	54	62		108	11-11
57	57	87		13-3	73	73		131	12-7
73	72	128		11-9	67	68		115	12-8
63	66	98		12-11	61	73		138	12-4
51	59	103		12-7	63	66		122	12-11
68	70	114		12-9					

Boys					Girls				
Comp.	Reas.	K.A.	IQ	Age	Comp.	Reas.	K.A.	IQ	Age
				Devotion School - I					
67	68		112	11-11	70	64		113	12-1
72	70		122	12-6	68	66		127	12-7
70	67		123	12-9	73	64		104	12-1
61	62		131	12-7	62	59		110	12-3
71	76		113	12-0	67	66		110	12-10
57	65		115	12-1	60	47		114	11-11
70	62		124	12-0	69	67		113	12-7
60	55		121	11-9	60	59		137	11-7
73	72		115	12-10	61	64		117	12-5
72	64		114	12-4	67	52		110	12-2
74	65		118	11-6	63	62		110	11-0
75	70		101	12-11	58	52		115	12-5
60	59		100	12-9	70	65		108	12-8
63	68		113	12-5	62	52		105	12-7
					69	64		134	11-3
					64	60		100	13-3
					66	69		103	12-1
					56	62		103	12-11
					62	67		124	12-3
					60	57		111	11-11
				Devotion School - II					
79	72		125	119	77	70		129	12-1
77	72		101	13-3	61	57		109	12-8
73	76		113	12-5	75	58		114	13-11
69	72		102	12-2	69	65		126	12-1
68	60		117	12-4	80	73		120	11-10
79	78		127	12-1	72	78		113	12-7
68	68		107	12-8	71	72		116	12-1
75	76		106	12-9	80	80		121	13-0
82	67		103	12-11	71	70		119	12-1
82	75		115-	12-3	69	60		118	11-11
73	73		108	12-2	75	68		117	12-1
73	68		128	12-3	64	68		128	12-5
80	80		121	12-1	73	76		117	12-11
63	73		109	12-7	61	62		125	12-11
74	72		121	12-7	63	55		116	12-2
79	75		126	12-5	70	66		113	11-8
73	64		120	12-1	70	66		114	13-1
					71	68		114	12-0
					71	66		124	11-6

Boys				Girls			
Comp.	Reas.	K.A. IQ	Age	Comp.	Reas.	K.A. IQ	Age
			Devotion School - III				
62	57	102	12-1	60	52	103	12-7
47	37	-	13-5	61	49	101	12-1
35	46	101	12-4	44	55	98	12-6
46	43	87	13-9	68	44	109	12-6
59	59	94	12-2	60	46	97	12-6
63	54	92	12-5	63	46	-	13-8
58	65	109	12-5	46	52	101	12-9
73	67	96	12-11	59	49	120	11-8
68	79	124	12-9	57	42	95	12-9
41	37	77	14-2				
45	49	93	12-5				
61	38	102	12-5				
70	47	99	12-10				
66	47	99	12-9				
61	55	102	12-11				
69	65	104	12-4				
			Driscoll School - I				
75	76	109	12-2	69	70	132	11-9
68	66	102	12-7	52	59	112	12-9
62	65	105	12-6	64	68	102	12-5
74	68	106	12-3	67	65	121	12-6
52	52	113	12-1	71	66	-	12-5
64	72	-	13-4	64	60	111	12-11
41	46	91	14-4	69	75	114	13-0
50	60	104	12-7	63	66	132	12-5
85	76	117	12-10	56	64	98	13-1
63	52	107	12-3	57	65	110	12-5
53	65	105	12-4	62	55	89	12-4
55	44	93	12-9	61	64	96	14-5
57	59	91	13-5	59	65	96	12-5
59	66	-	12-7	70	78	135	11-5
74	73	114	12-0	60	65	111	12-7
57	47	102	12-2	52	55	104	13-7
			Driscoll School - II				
47	57	104	12-8	45	46	92	12-11
39	42	92	14-0	60	65	109	12-6
73	72	101	13-0	54	52	102	12-3
70	62	109	12-2	67	75	117	12-3
57	57	103	12-1	69	67	113	12-0
64	68	109	12-7	72	72	127	12-4
71	75	112	12-8	62	67	108	12-10

Boys					Girls				
Comp.	Reas.	K.A.	IQ	Age	Comp.	Reas.	K.A.	IQ	Age
				Driscoll School - II (cont.)					
59	64		102	12-9	44	49		86	13-2
74	73		119	12-5	70	67		115	11-9
69	57		98	12-4	73	70		116	12-4
49	59		113	11-11	56	54		108	11-11
73	83		117	12-3	56	57		111	11-11
64	59		113	12-11	73	62		115	11-9
64	62		88	13-0	48	42		112	12-6
50	60		104	13-0	58	60		105	13-1
54	59		126	12-10					
60	62		103	12-11					
				Heath School - I					
50	57		90	13-2	52	59		89	13-0
60	54		101	12-1	57	62		101	12-10
68	62		110	12-7	53	57		104	13-11
58	64		98	12-6	64	62		109	12-7
72	67		107	12-0	42	46		98	12-6
54	44		93	12-9	61	55		109	12-7
61	62		85	12-8	67	65		83	12-7
67	62		103	12-1	55	57		102	12-2
66	65		116	13-6	61	66		103	13-2
64	60		96	13-2	64	54		107	11-8
66	65		103	12-5	63	67		123	12-0
49	47		98	12-10	56	59		105	12-9
53	59		97	12-2	62	67		101	12-10
62	62		94	13-4	69	60		104	12-3
58	66		93	14-6	55	54		98	12-7
52	65		107	12-5	63	73		127	11-8
					75	72-		125	11-10
					58	47		116	12-5
					60	65		117	12-4
				Lawrence School - I					
60	62		115	12-4	80	79		118	12-3
60	62		106	13-8	62	66		99	12-11
48	55		79	14-9	77	79		122	12-4
71	66		98	13-3	73	68		105	12-10
56	70		102	12-9	56	42		94	12-9
68	66		110	11-11	59	67		108	11-9
74	72		120	12-11	60	65		106	12-5
74	73		118	12-8	72	73		115	11-10
79	76		105	12-11	72	68		113	12-4

Boys				Girls			
Comp.	Reas.	K.A. IQ	Age	Comp.	Reas.	K.A. IQ	Age
			Lawrence School - I (cont.)				
74	76	124	11-11	67	72	117	12-2
61	67	116	12-5	59	60	81	15-3
73	80	82	14-9	72	76	120	12-10
57	44	112	12-1				
			Lawrence School - II				
59	46	91	13-0	62	62	108	12-7
68	67	116	11-11	77	68	102	11-7
80	75	133	12-5	81	73	114	12-5
70	62	125	11-10	55	57	110	12-3
82	79	118	12-7	62	48	117	12-5
84	79	114	11-11	70	67	130	11-11
62	57	89	15-2	66	54	117	12-1
72	62	106	12-0	58	67	106	13-2
71	73	105	12-7	74	75	125	12-3
68	65	120	13-0	67	57	114	12-7
70	64	112	12-1				
58	46	92	14-2				
61	57	93	13-0				
71	73	119	11-10				
			Lincoln School - I				
45	55	83	14-2	64	65	111	11-0
49	64	78	14-11	66	68	111	12-3
59	75	109	13-0	66	65	109	12-0
55	66	104	13-6	54	64	119	12-0
64	70	112	12-0	67	68	105	13-2
59	68	87	14-8	52	52	103	13-1
59	55	105	12-7	61	62	117	12-1
48	59	113	12-0	64	66	112	12-7
67	62	112	12-5	58	54	98	12-0
61	62	104	12-3	39	43	81	15-4
52	47	101	12-0	63	55	93	12-0
56	65	89	15-3	56	65	91	14-0
				51	47	100	12-7
				62	60	113	12-0
				61	52	102	13-0
				50	59	88	14-2
				69	66	113	12-0
				50	52	99	12-3

Boys				Girls			
Comp.	Reas.	K.A. IQ	Age	Comp.	Reas.	K.A. IQ	Age
			Lincoln School - II				
56	60	92	14-0	49	54	91	12-9
60	65	91	13-9	55	66	109	12-10
57	43	-	12-8	47	57	93	12-5
59	65	89	15-0	49	72	104	12-0
70	75	107	12-10	59	64	88	14-3
63	65	90	13-11	61	65	112	12-1
53	57	95	13-7	56	73	98	13-1
66	64	109	14-4	55	66	103	12-4
55	54	97	13-3	67	72	109	12-8
64	65	105	13-0	58	66	110	12-6
49	65	89	13-6	58	68	94	12-8
59	62	107	12-6	55	68	96	13-3
49	44	87	14-9	60	57	106	12-9
56	59	96	13-6				
62	57	102	12-3				
57	66	92	14-7				
60	79	115	12-3				
			Pierce School - I				
49	44	84	14-1	55	62	92	14-11
68	67	87	14-4	51	43	92	12-11
67	67	116	12-2	73	67	116	12-5
66	64	98	12-11	61	43	98	13-0
79	75	130	12-3	67	65	108	12-9
66	67	104	12-6	67	65	124	11-9
58	54	99	12-6	64	55	-	12-5
57	72	100	12-0	79	79	115	12-7
48	46	86	14-4	61	73	85	15-2
62	65	98	12-7	61	60	101	13-0
60	64	105	13-0				
58	46	73	15-0				
			Pierce School - II				
66	72	110	12-2	53	47	97	13-1
63	68	116	12-9	58	47	88	13-6
50	47	91	12-3	59	49	83	15-0
72	65	110	12-4	61	44	98	12-8
64	55	111	12-3	64	62	106	12-5
56	60	102	12-5	62	44	98	12-8
64	62	110	12-5	52	42	94	13-5
74	76	137	12-2	55	43	97	12-4

Boys				Girls			
Comp.	Reas.	K.A. IQ	Age	Comp.	Reas.	K.A. IQ	Age
			Pierce School - II (Cont.)				
66	65	108	11-11	64	54	99	13-6
56	54	89	14-11	64	69	108	13-1
50	46	91	14-4				
50	55	103	11-11				
			Runkle School - I				
57	66	108	12-11	56	44	110	12-9
69	57	124	12-5	66	66	105	12-9
52	57	102	12-3	56	52	110	12-3
59	62	70	14-2	58	66	126	12-4
63	68	108	12-9	63	54	113	12-7
46	47	83	13-11	46	44	102	13-5
66	70	109	12-5	55	49	103	12-1
66	76	113	12-8	61	73	117	12-10
56	57	110	12-2	71	55	109	12-3
74	75	122	12-7	73	72	125	12-2
62	65	111	12-7	58-	57	112	12-5
68	65	112	12-3	55	62	105	12-9
79	75	118	12-1	56	52	111	13-1
57	64	116	12-1	51	52	101	12-3
71	68	117	12-4	73	72	138	11-8
39	52	119	12-5	55	52	102	13-2
47	54	105	13-5	53	55	107	12-6
				51	62	107	12-4
			Runkle School - II				
72	67	117	12-4	49	64	117	12-7
73	66	101	12-6	62	64	119	12-2
68	73	113	12-5	55	38	92	13-3
51	57	89	12-11	57	60	106	12-5
59	65	86	13-6	57	62	115	12-4
68	57	107	12-3	58	55	110	12-5
55	64	96	12-0	69	65	121	12-0
52	65	107	11-11	44	57	117	12-0
56	65	118	12-6	66	64	128	11-11
57	60	107	11-11	49	47	120	12-0
77	73	120	12-0	69	67	118	12-8
41	46	92	13-5	71	76	118	12-10
45	73	116	12-1	57	57	110	12-4
66	61	106	12-5	50	49	105	12-9
42	59	99	12-11	61	60	121	12-4
67	67	127	11-10	51	52	94	12-7