VARIATIONS IN THE READING ABILITY OF ELEMENTARY SCHOOL PUPILS

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Since about 1910 the concept of individual differences has become more and more prominent in educational literature. Nearly every treatment of classification of children, or of methods of teaching, or of educational psychology deals with the facts of individual differences.

In 1913 Thorndike published his three-volume work on educational psychology. Of the 400 pages of the third volume more than 250 are used to discuss the then-known facts about individual differences and their causes. It is a comprehensive treatment in seven chapters of many phases of this subject, which has since become so vital in all educational theory and practice.

An increasing volume of literature on this subject has been accumulating since 1910. Practices as to amounts of subject matter to be required, standards of achievement to be applied, and kinds of subject matter to be studied have been enormously modified by our growing knowledge about individual differences. Promotion plans and even the organization of schools have been greatly influenced and changed in response to new knowledge concerning the facts of individual differences.

Almost any reliable test of achievement in school will provide data for an analysis of the variations in ability among children. In April 1943 a standardized objective test in reading was given to 726 children comprising grades four, five, six, and seven of the five elementary schools of Norman. In the four grades named there were 370 boys and 356 girls who took the test and had scores recorded of their achievements. The test used was the Thorndike-McCall Reading Scale, Form 8. This is a test only of reading comprehension; it yields no score on rate in reading. The highest possible crude score is 39. The crude scores are convertible into T scores, G scores (or grade scores), and age scores. Since this is a standardized test there is a standard crude score for each grade. For grade four the standard crude score is 18; for grade five, 21; for grade six, 24; and for grade seven, 26. There are standards on this test for the other grades beyond the seventh up to and including grade 16. In other words, this test is usable and is standardized for all grades through the four undergraduate years of college.

The scores of the 726 children in the grades mentioned have been arranged, for purposes of comparison and analysis, in four different classifications. First, all children, boys and girls, in the five schools, have been thrown together for comparison by grades alone. Then the achievements of the children in two elementary schools of Norman have been compared. Third, a comparison is made between the scores of the younger children and those of the older children in grades four and five. Fourth, and last, the comparative achievements of boys and girls are analyzed.

The classification of children into groups called grades in our schools was made on the assumption that children in the same grade are qualified to do the same work. For example, there were 186 boys and girls in the fourth grade of the Norman schools who took the reading test described above. In April 1943 the most of them had gone to school nearly four years and were probably about 10 years of age. The assumption was that they were about equally qualified to do about the same kind and amount

of work at the same standard of achievement because they were of about the same age and had had the same amount of schooling. However, the comparison of crude scores made by the children not only in the fourth grade but in the other three grades shows that the assumption of equality, or even near equality, in ability to achieve is very far from correct.

The range in crude scores in the fourth grade was from 0 to 32. As interpreted on the tabulation sheet of the Thorndike-McCall Reading Scale a score of 0 means a grade score of 1.4 (the fourth month of the second year of school) and an age score of 5.6 years; whereas, a crude score of 32 means a grade score of 13.3 (the third month of the second year in college) and an age score of 16.9 years.

The one child who made the remarkably high score of 32, indicative of comprehension on the level of a second-year student in college, was 9.4 years of age at the time. In the class of 33 children there were only two others who were younger. This highest score was made by only the one pupil in the entire fourth grade of 186, only 13 of whom were younger than the one who made it. The next highest crude score in this fourth grade was made by one pupil and was 29.

Like the fourth grade, grades five, six, and seven show wide ranges in reading ability. In grade five the range in crude scores was from 7 to 33; in grade six, from 4 to 34; in grade seven, from 4 to 36. To interpret the range in grade seven, the crude score of 4 signifies a grade score of 2.3 and an age score of 7.0 and the crude score of 36 represents a grade score of 15.1 and an age score of 19.8. Children of such widely varying reading abilities are in the same grade.

Since the examples thus far discussed involve only a few extreme cases it is now desirable to show the nature of the variations in ability by using a larger portion of the total group. For this purpose the percentage of each grade which read at a level one year or more above standard and the percentage which read at a level one year or more below standard were calculated for each of the four grades. As applied to the fourth grade this calculation would give the percentage which read at the fifth grade standard or above, on the one hand, and the percentage which read at the third grade standard or below, on the other. This would mean a difference in reading ability of two years or more. On this calculation 26.3 per cent of the fourth grade pupils read at the fifth grade level or above, and 27.4 per cent read at the third grade level or below. This means that 53.7 per cent of the 186 pupils of the fourth grade, who presumably were nearly alike, in ability, comprised two groups that were two grades or more separated in reading ability.

Similar percentages for the fifth grade gave 33.9 who read one year or more above standard, and 24.7 who read one year or more below standard. In the fifth grade therefore 58.6 of the total number of 162 represented extremes that were two years or more separated in reading ability.

In the sixth grade 41.5 per cent of the total number of 193 read one year or more above standard, and 31.6 per cent read one year or more below standard. In this grade then 73.1 per cent of the pupils were in two groups that were two years or more apart in reading ability.

In the seventh grade 40.5 per cent of the 185 pupils read one year or more above standard, and 31.9 per cent read one year or more below standard. In this grade 72.4 per cent were separated by one year or more from the standard in reading ability.

It should be observed that differences are greater in grades six and seven than in grades four and five. In the former two grades the percentages one year or more from standard are over 70; in the two latter grades these percentages are in the 50's.

One final comparison of these scores by grades shows another phase of the variations in reading ability. This is a comparison of the scores made by pupils in one grade with scores made by pupils in another grade. For example 16 pupils in the fourth grade made raw scores of 24 or above. This is a grade score of 6.8 or more. At the same time in the seventh grade, where the pupils have had three years more of schooling than the above-mentioned 16 high-scoring pupils of the fourth grade, there were 48 pupils who scored less than 24.

From the comparisons made of scores in reading tabulated by grades it may be concluded that pupils in the same grade differ enormously in reading ability. Any assumption for teaching purposes that children who have spent about the same time in school are nearly alike in reading ability is not in accordance with the facts. In addition, children in different grades differ widely in reading ability as shown by the fact that on this test about nine per cent of the fourth grade children scored higher than did 28 per cent of the seventh grade children.

As already indicated there are five elementary schools in Norman. Each school serves a defined portion of the Norman district. It is assumed that the school authorities undertake in good faith to provide equally good schools in all of the five districts. The length of term is the same for all, nine months in each case. The same textbooks and courses of study are used in all schools. Building and equipment of comparable quality are available in all districts. The teachers in all schools are about equally qualified and put forth comparable efforts to produce satisfactory achievement. If no other conditions affected the achievement of children than those provided by the school it might reasonably be expected that the pupils in all schools would achieve at about the same standard or level. An analysis of the scores on this reading test by buildings will throw light on this expectation.

To state the results as briefly as possible a comparison is made of the crude scores of the four grades in only two schools. The schools selected for this comparison are the highest-scoring school, which shall be called School H, and the lowest-scoring school, which shall be called School L. Under the similar conditions provided by the two schools, how did the children achieve on this standardized objective test?

In the fourth grade the mean score of School H was 18.94, and of School L, 17.34. The difference was 1.6 in crude scores; a percentage difference of 9. In grade five the mean score of School H was 25.1; of School L, 20. The difference is 5.1 in crude scores, or a percentage difference of more than 25. In grade six the mean crude score of School H was 26.17; of School L, 22.7. This is a score difference of 3.47, and a percentage difference of 15. In grade seven the mean in School H was 27, and in School L 24.72. This is a score difference of 2.28, and a percentage difference of 9. In all grades School L fell below School H by percentages ranging from 9 to 25.

The standards for the four grades are in order 18, 21, 24, 26. School H was above standard in every grade. School L was below standard in every grade.

Another comparison is valuable in showing the nature of the achievement in the two schools. This is a comparison of the percentages of the pupils in each grade of the two schools who scored at standard or above. In grade four the respective percentages are 62 for School H and 51 for School L. In grade five these percentages are 90 and 52. In grade six they are 78 and 34; in grade seven, 59 and 45. In every case School H has a relatively high percentage above standard and a low percentage

below standard, and School L has a relatively low percentage above standard and a high percentage below standard.

These results throw light on whether objective tests may be used to determine the relative successes of teachers. If this should be done then the teachers in School L are by no means as successful as those in School H. This does not seem to be a defensible conclusion. Wherever mental tests have been given in high-scoring and low-scoring schools equally great differences in mental ages in favor of the high-scoring schools have been found. In addition, when criteria for economic well-being have been applied the high-scoring schools have scored high on such criteria. Other factors than teaching, housing, and equipment affect the achievement of children in school. Objective tests should not be used to measure the success of individual teachers.

In his studies on the intelligence of school children Professor Terman has shown that the chronologically young children usually make the best scores and the chronologically old in general make the poorest scores. He shows further that according to mental age the chronologically young are retarded and the chronologically old are accelerated.

Figures on chronological age as related to scores on this reading test were compiled for grades four and five. In both grades the ages and test scores of two groups were compared. One group was made up of those whose reading score was one or more years above the standard, and the other group was those whose reading score was one or more years below the standard for the grade. These constituted then a high-scoring group and a low-scoring group in each grade. How did the two groups in each grade compare as to chronological age?

In the fourth grade there were 49 children who scored one year or more above the standard for that grade. The mean chronological age of this group was 9.97 years. There were 51 children who scored one or more years below the standard for this grade. The mean chronological age of this group was 10.4 years. The low-scoring group was 0.43 of a year older than the high-scoring group. This is slightly more than five months difference in age.

In the fifth grade there were 54 children whose scores were one or more years above standard. Thirty-nine had scores one year or more below standard. The mean age of the high-scoring group was 10.8 years. Of the low-scoring group it was 11.5 years. The low-scoring group was 0.7 of a year older than the high-scoring group. This is slightly more than eight months.

A final analysis of differences among children as disclosed by this reading test is the comparison between the scores of boys and girls. In the four grades there were 370 boys and 356 girls. The mean scores for boys and girls separately were calculated for each grade.

In every grade the mean score of the girls was higher than that of the boys. In grades four and seven the difference was slight, being less than two per cent. In grade five the difference was five per cent, and in grade six it was eight per cent.

Other studies of differences in achievement in different subjects by boys and girls have shown that in general boys tend to excell in mathematics and sciences; girls tend to excell in the English subjects and in foreign languages.