THE MENTAL INDICES OF SIBLINGS

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In the course of giving group tests to a large number of children the writer had the opportunity to compare the performances of many groups of brothers and sisters. The six tests used were (1) Rote Memory Test for concrete words; (2) Digit-Symbol Test; (3) Symbol-Digit Test; (4) Word Building; (5) Easy Opposites; (6) Cancellation. The results obtained with this group of tests, the percentiles for each age and the method of calculating the mental index of each child have been described elsewhere¹ and need not be repeated here.

Out of a great number of grade-school children tested 180 families, of which two children had been tested, and 37 families of three children were found. There were only about five families of four children and these have not been considered. The families of which two or three children have been tested will be dealt with here. A mental index of 50 denotes average ability for any age. Indices above or below 50 indicate abilities above or below the median ability. Is there a greater similarity between the indices of siblings than those of unrelated children?

The average deviation of the mental indices of a family may be taken as one measure of the resemblance of mental ability. The average deviations for the families of two and three were calculated. These average deviations are compared with the deviations obtained by choosing any individuals at random. In the chance selections the cards of unrelated children were thoroughly mixed and then taken in order. The chance selections compared with the families of three contained, of course, three individuals, and similarly

¹ Pintner, R., 'The Mental Survey.' D. Appleton and Co. 1918.

those compared with the families of two contained two individuals. The children attended two different schools and the schools were treated separately and then combined. The averages of the A.D.'s for the various groups are:

	Families of Three		Chance Selections	
	No. of Cases	Average A.D.	Average A.D.	No. of Cases
School <i>A</i>	20	11.1	13.8	20
School <i>B</i>	17	12.6	13.4	17
Both schools.....	37	11.7	16.7	37
			14.9	37
			13.6	37

	Families of Two		Chance Selections	
	No. of Cases	Average A.D.	Average A.D.	No. of Cases
School <i>A</i>	91	9.8	11.9	91
School <i>B</i>	89	9.9	11.6	89
Both schools.....	180	9.8	12.0	180
			12.3	180
			11.7	180

In School *A* there were twenty families of three and the average of the average deviations of the twenty groups is 11.1. A chance selection of twenty groups of three unrelated individuals each in the same school gives an average A.D. of 13.8. For the total number of families of three the average A.D. is 11.7 and this is compared with three different chance selections each of 37 groups of three unrelated children. In the same way the 180 families of two are compared with three chance selections each of 180 groups of two unrelated children.

It will be seen that the A.D.'s of the siblings are smaller than those of unrelated children. The difference is, to be sure, not very great, but it is present in each school and both in regard to the families of two as well as to the families of three. The average A.D.'s of the chance selections are remarkably similar to each other, and this fact, taken in conjunction with the number of chance selections calculated, seems to show pretty conclusively that the greater resemblance of the mental indices of siblings is not due to chance. At the same time this resemblance is not very marked.

There are many families in which the mental indices of the children differ widely. The largest A.D. for any pair calculated was for a pair of siblings, one of which was feeble-minded and the other slightly above average.

In another treatment of the same data, Yule's¹ association coefficient,

$$Q = \frac{(AB)(\alpha\beta) - (A\beta)(\alpha B)}{(AB)(\alpha\beta) + (A\beta)(\alpha B)},$$

using above and below an index of 50 as the dividing line, was used. This coefficient has been calculated for the 180 families of two and for various chance selections with the following results:

	<i>Q</i>	<i>n</i>
School <i>A</i>	.47	91
School <i>B</i>	.28	89
Both schools.....	.39	180
Chance selection of sibs.....	.09	180
Chance selection of sibs.....	.14	222
Chance selection of unrelated children.....	.14	151
Chance selection of unrelated children.....	.19	300

The chance selection of siblings means that the mental indices of the siblings were used, but no two siblings were ever paired. The chance selection of unrelated children excludes the mental indices of the siblings. Here again we note that the coefficient for the siblings is considerably higher than that obtained by any of the chance selections.

The above facts may also be expressed in this manner. There were 114 pairs of siblings, or 63 per cent., in which both members of a pair had a mental index above 50 or both below 50; and there were 66 pairs, or 37 per cent., in which one member had an index above and the other an index below 50. In a chance selection of 180 unrelated pairs (using the indices of the siblings) 99 pairs, or 55 per cent., had both members either above or both below 50; and there were 81 pairs, or 45 per cent., in which one member was above and one below 50.

The Pearson coefficient for the 180 pairs of siblings is $r = .22$, with a P.E. of .02. This correlation is slightly

¹ Yule, G. Udny, 'An Introduction to the Theory of Statistics,' 1916, p. 38.

lower than those obtained by Thorndike for three single tests, namely 29, 30 and 32. Earle's coefficients for spelling ability ranged from .22 to .50. It is much smaller than that obtained by Peters for memory, namely $r = .36$. In the same way the association coefficient of $Q = .39$ for our siblings is smaller than the coefficient of $Q = .53$ obtained by Peters for school grades.

On the whole the general intelligence of siblings is more nearly alike than the general intelligence of unrelated children selected by chance. This greater resemblance is unquestionably due to inheritance, for we are not here dealing with activities that are much influenced by school training. A larger number of tests and a better technique than the group-test method would undoubtedly have shown a greater resemblance, but the resemblance of the mentality of siblings is clearly present, and we have found it even by means of our rough survey tests.