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## TWIN SIMILARITIES IN OCCUPATIONAL INTERESTS\*

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Some very important problems in the analysis of occupational interests may be approached through study of family resemblances in those traits which the interest scales measure. In his recent book, Fryer<sup>2</sup> furnishes an admirable summary of literature bearing on this field of mental measurement, and his discussion of the inheritance of interests shows clearly the need for data of the type reported in the present paper. He points out that psychologists commonly regard interests as developed through experience and environmental in cause. He gives the further observation that this conclusion is a negative one, based on the absence of proof that interests are of inherited origin, and states that the positive proof that interests are determined to a large degree by the chance stimulations of the environment is not forthcoming, and that no work has been done upon the problem. It seems that knowledge concerning the origins of interests should be of value to the psychologist intent upon improving and perfecting the measuring instruments, to the vocational counselor studying the problems of the individual, and to the student of mental heredity in his analysis of the relations among interests, abilities, and experiences. In view of these considerations it has been considered worth while to report the present findings concerning the similarities of twins in occupational interests. In determining the origins of the traits measured further studies are of course necessary, but it is felt that

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\* The present study represents one aspect of the intensive investigation of twin similarities which the writer is carrying out at Stanford University under the direction of Dr. Lewis M. Terman. These studies were made possible by a grant from the Social Science Research Council.

determination of the degree of resemblance of related persons is an important first step in the undertaking.

## THE DATA

The Strong Vocational Interest Blank was administered to one hundred twenty sets of twins, and the blanks were scored for the interests characteristic of successful persons in twenty-three different occupations. Table I shows some facts concerning the subjects, the groups into which they fall, and the age groupings.

TABLE I.—THE SUBJECTS

	Numbers of pairs		
	Junior and senior high school group	Older group not in school	Total No. of pairs
Monozygotic twins			
Males . . . . .	17	4	21
Females . . . . .	12	10	22
Like-sex dizygotic twins			
Males . . . . .	22	0	22
Females . . . . .	21	0	21
Dizygotic twins of unlike sex	33	1	34
Total No. of pairs . . . . .	105	15	120

From Table I it may be seen that most of the subjects are in the junior and senior high schools. It is here assumed that the inclusion of a few older pairs has not materially affected the particular results reported here. Further treatment will be reported to show exactly what effect the age factor may have had upon the correlations. It is generally assumed that interests change with age most rapidly during youth, hence an inquiry has been made concerning age effects using the younger group. The present data are not adequate for determining the differences between the younger and older groups in similarity of interests, as with such small numbers of cases the errors of sampling are large. Inspection of the data suggests that older twins do not differ significantly from younger twins in similarity of interests, but perhaps in general the older pairs are slightly less alike. However, scores of older persons may tend to be slightly higher on some of the scales and lower on others, and hence because of the effect upon

the range and central tendencies of distributions of scores, the inclusion of the few older pairs may have had some effect upon the correlations reported. That this effect is probably a slight one will be pointed out later.

Classification of the twins into identical and fraternal groups was made according to the criteria outlined by Dahlberg,<sup>1</sup> Siemens,<sup>5</sup> Newman,<sup>4</sup> Muller,<sup>3</sup> and others.

#### THE EFFECTS OF AGE

Table II shows the effects of age upon interest test scores for the younger group in junior and senior high school. There were one hundred ten boys and one hundred ten girls in the groups for which the correlations were calculated, hence the probable error of each correlation in Table II is approximately .06. Preliminary inspection of the data had suggested that the group was sufficiently homogeneous so that it would not be necessary to subdivide it according to age for further study. The data of Table II support this conclusion, since there appears to be no significant correlation of interest scores with age for this group. Since it is generally assumed that the change of interests with age is greatest for the younger ages, it seems unlikely that separate treatment need be given to the few older pairs who are not included in the school group.

Preliminary study has shown that there are sex differences in means and standard deviations of the distributions of scores on a number of the occupational interest scales. These sex differences are sufficiently large to be demonstrably significant, and hence must be taken into account. This paper deals primarily with twin similarities, and hence does not attempt an exhaustive analysis of the factors underlying those sex differences. Such analysis is reserved for another paper, and the correlations reported here are calculated separately for the two sexes to avoid spurious correlation which might arise from combination of groups differing in standard deviation and means.

The Strong Vocational Interest Test which has been used in the present study has of course been developed mainly for use with older subjects, but from several points of view the present data are especially valuable. The importance of genetic studies to find out all we can about the origins and development of occupational interests is not questioned. The findings here reported do not depend in any way upon the norms established for older groups to determine diagnostic ratings. The administering of the tests was carefully supervised by

TABLE II.—SHOWING THE CORRELATIONS OF AGE WITH INTEREST TEST SCORES, FOR BOYS AND GIRLS SEPARATELY. ALL ARE JUNIOR AND SENIOR HIGH SCHOOL STUDENTS. THERE WERE ONE HUNDRED TEN BOYS RANGING IN AGE FROM TWELVE TO NINETEEN YEARS INCLUSIVE, WITH A STANDARD DEVIATION OF 1.5 YEARS, AND THE MEAN AT AGE 15.9. THE ONE HUNDRED TEN GIRLS RANGED IN AGE FROM THIRTEEN TO EIGHTEEN YEARS INCLUSIVE, WITH A STANDARD DEVIATION OF 1.25 YEARS, AND A MEAN AT AGE 16.1

	Correlations	
	For boys	For girls
1. Advertiser. . . . .	-.04	.01
2. Architect	.08	-.10
3. Artist	-.08	-.06
4. Certified public accountant	.08	-.17
5. Chemist	.10	-.10
6. Doctor.	-.02	-.16
7. Engineer	.13	-.15
8. Farmer	.22	-.20
9. Journalist	-.06	-.06
10. Lawyer	.07	-.09
11. Life insurance salesman	.00	.10
12. Minister	-.03	.07
13. Personnel manager	.11	.16
14. Psychologist	-.02	-.12
15. Purchasing agent	.25	.16
16. Real estate salesman	.08	.07
17. School man.	.09	-.02
18. Vacuum cleaner salesman	-.01	.14
19. Y.M.C.A. secretary	.02	.12
20. Office clerk	.12	.12
21. Physicist	.00	-.26
22. Mathematician..	.02	-.30
23. City school superintendent	.18	.03
Mean of correlations	.06	-.035
Mean of absolute magnitude of these correlations.	.08	.12

Note: It is unnecessary to report each probable error for correlations of this narrow range of magnitude. The largest correlation is .30, and its probable error is .058. The smallest correlation is .00 and its probable error is .064. Hence the probable error of each coefficient, given to two places, is .06.

the writer or by an equally competent examiner, to eliminate possible misunderstandings on the part of the subjects. Because of the importance of the twin control in the determination of the inheritance of interests, and because the group here investigated comprise a more nearly random sampling of the population than could be obtained using older subjects, the data are doubly valuable for the purposes for which they were obtained.

The literature on interest inventories shows that the interest test measures something which does not depend primarily upon intelligence, but that scoring schemes can be devised which will yield ratings of intelligence and scholarship. For this reason it has been thought desirable to report the correlations between intelligence and scores on each of the interest scales for the present groups. Those correlations are given in Table III.

The work of Strong,<sup>6</sup> and that of Thurstone<sup>8</sup> have shown separately by different types of analysis that the interests measured by these different scales tend to fall into related groups. There are four such groups, depending upon interest in science, interest in language, interest in people, and interest in business. Table IV presents the correlations of intelligence and interests for the scales grouped according to these four types of interest.

The data of Table III and of Table IV indicate that there is a definite correlation between intelligence and certain types of interest, but that the relationship is not a close one. As might be expected, the relationships are not the same for boys as for girls. The interests in science are positively correlated with intelligence for both groups, but the correlation is greater for females. In general, interests in language are uncorrelated with intelligence for boys, but there is a definite positive correlation for girls. It appears that for this group of girls, interests in people show a consistent slight negative correlation with intelligence, while for boys there is a small but consistent positive correlation. The business group of interests correlate negatively with intelligence for both groups, but the relationship is closer in the case of the females. The important facts are that intelligence is definitely related to certain types of interest, that the relationships show definite sex differences, and that the correlations are low enough to show that the interest scales measure traits not primarily associated with intelligence. It is necessary to point out that the subjects were all junior and senior high school students, and that different results might be obtained for different groups.

TABLE III.—SHOWING THE CORRELATIONS OF TERMAN GROUP TEST IQ'S WITH OCCUPATIONAL INTEREST SCORES, FOR BOYS AND GIRLS SEPARATELY. THERE WERE SEVENTY BOYS, WHOSE IQ'S RANGED FROM SEVENTY-THREE TO ONE HUNDRED FORTY, WITH A MEAN OF 101.1 AND A STANDARD DEVIATION OF 14.4 POINTS. THERE WERE SEVENTY-FIVE GIRLS, WHOSE IQ'S RANGED FROM SEVENTY-THREE TO ONE HUNDRED TWENTY-SEVEN, WITH A MEAN OF 101.5 AND A STANDARD DEVIATION OF 12.8 POINTS. ALL THE SUBJECTS WERE JUNIOR AND SENIOR HIGH SCHOOL STUDENTS

	Correlation coefficients			
	For the boys		For the girls	
	r	PE	r	PE
1. Advertiser	-.11	.08	.23	.07
2. Architect	.07	.08	.30	.07
3. Artist..	.04	.08	.24	.07
4. C.P.A .	.09	.08	-.08	.08
5. Chemist.	.31	.07	.36	.07
6. Doctor	.04	.08	.32	.07
7. Engineer.	.17	.08	.36	.07
8. Farmer .	.02	.08	.20	.07
9. Journalist	-.09	.08	.22	.07
10. Lawyer....	.13	.08	.31	.07
11. Life insurance salesman	-.19	.08	.01	.08
12. Minister....	.23	.08	-.08	.08
13. Personnel manager.	.27	.07	-.03	.08
14. Psychologist.....	.36	.07	.34	.07
15. Purchasing agent	.00	.08	-.13	.08
16. Real estate salesman	-.15	.08	.05	.08
17. School man . . . .	.35	.07	-.04	.08
18. Vacuum cleaner salesman	-.14	.08	-.44	.06
19. Y.M.C.A. secretary....	.14	.08	-.19	.07
20. Office clerk.....	.09	.08	-.24	.07
21. Physicist.....	.19	.08	.33	.07
22. Mathematician.....	.18	.08	.23	.07
23. City school superintendent.....	.32	.07	.03	.08
Mean of correlations. ....	.10	.	.10	
Mean of absolute values of these correlations	.16	.	.21	

TABLE IV.—THE RELATION OF TYPE OF INTEREST TO INTELLIGENCE  
(The correlations are taken from Table III)

	Correlations	
	For boys	For girls
The "science" group of interests:		
1. Psychologist.....	.36	.34
2. Mathematician	.18	.23
3. Physician	.04	.32
4. Chemist..	.31	.36
5. Physicist.	.19	.33
6. Architect	.07	.30
7. Engineer	.17	.36
8. Farmer.....	.02	.20
Mean of correlations.....	.17	.30
The "language" group of interests:		
1. Journalist	-.09	.22
2. Lawyer .....	.13	.31
3. Advertiser	-.11	.23
4. Artist.....	.04	.24
Mean of correlations.....	-.01	.25
The "people" group of interests:		
1. Y.M.C.A. secretary.....	.14	-.19
2. City school superintendent	.32	.03
3. Personnel manager	.27	-.03
4. Minister..	.23	-.08
5. Teacher .....	.35	-.04
Mean of correlations .....	.26	-.06
The "business" group of interests:		
1. Vacuum cleaner salesman	-.14	-.44
2. Real estate salesman ..	-.15	.05
3. Life insurance salesman	-.19	.01
4. Purchasing agent	.00	-.13
5. Office clerk	.09	-.24
6. C.P.A .....	.09	-.08
Mean of correlations.....	-.05	-.14

## TWIN RESEMBLANCES

Tables V and VI show the correlations which were obtained for all groups of twins, for each of the twenty-three interest scales. For

TABLE V.—SHOWING THE CORRELATIONS OF SCORES ON THE STRONG VOCATIONAL INTEREST BLANK FOR MALE LIKE-SEX TWINS, AND FOR UNLIKE-SEX TWINS

	Identical twins, twenty-one pairs, all males		Fraternal like-sex twins, twenty-two pairs, all males		Unlike-sex twins, thirty-four pairs	
	r	PE	r	PE	r	PE
1. Advertiser	.39	.13	.23	.14	.12	.11
2. Architect	.71	.08	.06	.15	.02	.11
3. Artist	.35	.13	.02	.15	.08	.11
4. C.P.A.	.48	.12	.24	.14	.22	.11
5. Chemist	.74	.07	.29	.14	.46	.09
6. Doctor...	.59	.10	.00	.15	.46	.09
7. Engineer	.84	.04	.22	.14	.44	.09
8. Farmer.	.56	.10	.64	.09	.14	.11
9. Journalist	.47	.12	.24	.14	.04	.11
10. Lawyer	.77	.06	.18	.14	.27	.11
11. Life insurance salesman	.60	.10	.24	.14	.51	.08
12. Minister....	.58	.10	.13	.15	.32	.10
13. Personnel manager	.37	.13	.27	.14	.21	.11
14. Psychologist	.28	.14	.23	.14	.47	.09
15. Purchasing agent	.52	.11	.28	.14	.36	.10
16. Real estate salesman	.33	.13	.05	.15	.28	.10
17. School man....	.27	.14	.33	.13	.27	.11
18. Vacuum cleaner salesman	.66	.08	.14	.15	.37	.11
19. Y.M.C.A. secretary	.64	.09	.16	.15	.37	.10
20. Office clerk	.60	.10	.10	.15	.41	.10
21. Physicist....	.79	.06	.07	.15	.48	.09
22. Mathematician....	.56	.10	.14	.15	.29	.10
23. City school superintendent	.59	.10	.42	.12	.33	.10
Mean of correlations	.55	..	.20	...	.30	



the like-sex pairs of twins a double-entry method was used in making the scatterplots from which the correlations were calculated. For unlike-sex pairs a single-entry system was used, the boys scores being put on one axis and the girls on the other axis. The correlations for

TABLE VI.—SHOWING THE CORRELATIONS OF SCORES ON THE STRONG VOCATIONAL INTEREST BLANK FOR FEMALE LIKE-SEX TWINS, AND FOR UNLIKE-SEX TWINS

	Identical twins, twenty-two pairs, all females		Fraternal like-sex twins, twenty-one pairs, all females		Unlike-sex twins, thirty-four pairs
	r	PE	r	PE	
1. Advertiser . . . . .	.23	.14	.35	13	.12
2. Architect . . . . .	.52	.11	.45	12	.02
3. Artist . . . . .	.52	.11	.58	10	.08
4. C.P.A . . . . .	.46	.12	.38	.13	.22
5. Chemist . . . . .	.54	.11	.37	13	.46
6. Doctor . . . . .	.59	.10	.58	.10	.46
7. Engineer . . . . .	.63	.09	.06	.15	.44
8. Farmer . . . . .	.42	.12	.26	14	.14
9. Journalist . . . . .	.22	.14	.27	.14	.04
10. Lawyer . . . . .	.23	.14	.17	.15	.27
11. Life insurance salesman . . . . .	.47	.12	.38	13	.51
12. Minister . . . . .	.58	.10	13	15	.32
13. Personnel manager . . . . .	.54	.11	.42	12	.21
14. Psychologist . . . . .	.44	.12	.18	14	.47
15. Purchasing agent . . . . .	.20	.14	.42	12	.36
16. Real estate salesman . . . . .	.28	.14	14	15	.28
17. School man . . . . .	.58	.10	16	15	.27
18. Vacuum cleaner salesman . . . . .	.42	.12	.58	10	.37
19. Y.M.C.A. secretary . . . . .	.51	.11	.36	.13	.37
20. Office clerk . . . . .	.32	.13	.31	.14	.41
21. Physicist . . . . .	.51	.11	.37	13	.48
22. Mathematician . . . . .	.52	.11	.37	.13	.29
23. City school superintendent . . . . .	.66	.08	.16	.15	.33
Mean of correlations . . . . .	.45	...	.32	...	.30

unlike-sex twins are entered in both Table V and Table VI, for purposes of comparison.

Tables VII and VIII show further comparisons of the different groups of twins, giving average correlations based on the data of Tables V and VI. These comparisons were considered desirable

TABLE VII.—SHOWING COMPARISON OF CORRELATIONS OF SCORES ON THE STRONG VOCATIONAL INTEREST BLANK, FOR THREE GROUPS OF TWINS. THE CORRELATIONS WERE CALCULATED SEPARATELY FOR MALES AND FOR FEMALES OF THE LIKE-SEX GROUPS, AS SHOWN IN TABLES V AND VI. THE AVERAGES ARE PRESENTED HERE

	Identical twins, forty-three pairs	Like-sex fraternal twins, forty-three pairs	Unlike-sex twins, thirty-four pairs
1. Advertiser.	.31	.29	.12
2. Architect	.62	.26	.02
3. Artist .	.44	.30	.08
4. C.P.A. . . .	.47	.31	.22
5. Chemist. . .	.64	.33	.46
6. Doctor . . .	.59	.29	.46
7. Engineer.	.74	.14	.44
8. Farmer. . . .	.49	.45	.14
9. Journalist.	.34	.26	.04
10. Lawyer. . . . .	.50	.18	.27
11. Life insurance salesman.	.54	.31	.51
12. Minister. . . . .	.58	.13	.32
13. Personnel manager	.46	.34	.21
14. Psychologist. . . . .	.36	.20	.47
15. Purchasing agent. . . . .	.36	.35	.36
16. Real estate salesman	.30	.10	.28
17. School man. . . . .	.42	.24	.27
18. Vacuum cleaner salesman	.54	.36	.37
19. Y.M.C.A. secretary	.58	.26	.37
20. Office clerk. . . . .	.46	.20	.41
21. Physicist . . . . .	.65	.22	.48
22. Mathematician. . . . .	.54	.26	.29
23. City school superintendent . . . . .	.62	.29	.33
Mean of correlations. . . . .	.50	.26	.30

TABLE VIII.—COMPARISON OF THE CORRELATIONS OF SCORES ON THE STRONG VOCATIONAL INTEREST SCALES, FOR IDENTICAL TWINS AND FOR FRATERNAL TWINS. SINCE THE PREVIOUS ANALYSIS SHOWED THE LIKE-SEX FRATERNAL PAIRS NOT MORE SIMILAR THAN THE UNLIKE-SEX PAIRS, THE TWO GROUPS OF FRATERNAL TWINS ARE COMBINED HERE. THE COEFFICIENTS IN THIS TABLE ARE WEIGHTED AVERAGES, SINCE THE NUMBERS OF CASES IN THE TWO GROUPS DIFFERED

	Identical twins, forty-three pairs	Fraternal twins, average correla- tion for like and unlike-sex pairs. Total of seventy- seven pairs
1. Advertiser	.31	.21
2. Architect	.62	.15
3. Artist.	.44	.20
4. C.P.A....	.47	.27
5. Chemist.....	.64	.39
6. Doctor....	.59	.36
7. Engineer	.74	.27
8. Farmer. . .	.49	.31
9. Journalist	.34	.16
10. Lawyer. . . . .	.50	.22
11. Life insurance salesman .	.54	.40
12. Minister.....	.58	.21
13. Personnel manager	.46	.28
14. Psychologist.....	.36	.32
15. Purchasing agent.....	.36	.35
16. Real estate salesman	.30	.18
17. School man. ....	.42	.25
18. Vacuum cleaner salesman	.54	.36
19. Y.M.C.A. secretary	.58	.31
20. Office clerk . . . . .	.46	.29
21. Physicist. . . . .	.65	.33
22. Mathematician . . . . .	.54	.27
23. City school superintendent.....	.62	.31
Mean of correlations.....	.50	.28

because it was felt that much of the variation in magnitude of individual correlation coefficients is due to the smallness of the populations.

These further comparisons give an idea as to what might be the result if larger groups of subjects were tested.

It is evident from consideration of the trends of results shown in Tables V, VI, VII, and VIII that the interests of identical twins tend to be more similar than those of like sex fraternal twins, for both male and female pairs. There is no evidence that like-sex fraternal pairs are any more similar than unlike-sex pairs. The differences in similarity between identical and fraternal pairs are greater for males than for females.

#### NATURE AND NURTURE INFLUENCES

It is to be expected that members of the same family will show some degree of resemblance in occupational interests, regardless of one's point of view on the nature-nurture question. Unlike-sex pairs of twins will show some resemblance because they are siblings; they are somewhat similar in heredity, and their environments are certainly more alike than those of randomly selected pairs. Like-sex fraternal twins will also be similar, for the same two reasons, and if environment be important they may be more similar than are unlike-sex pairs. Moreover, if those aspects of inherited constitution which are determined by genes in the sex chromosome are important, all like-sex pairs will be more similar than unlike-sex pairs. The identical twins are expected to show greater similarity than the fraternal pairs, because of more similar heredity, and perhaps also because of more similar environments. It is likely that both heredity and environment have an effect upon family resemblances in interests of the type here considered. Determination of the extent of those resemblances is a necessary first step, and further observations are necessary to find out the relative contributions of nature and of nurture. With these *a priori* considerations in mind, we may now turn to the specific results of the present investigation.

#### CONCLUSIONS AND SUGGESTIONS

Since the analysis here reported is based upon study of a small number of subjects, it is necessary to be cautious in drawing conclusions. The fact that correlations tend to be higher for all groups on some of the scales than for other scales may be partly the result of differences in reliability of the various scales, but it does not seem appropriate to correct the coefficients for attenuation until reliability

coefficients can be obtained which are based on comparable groups. Those reported in the literature are based on older subjects.

In spite of various objections which may be raised, study of the available data seems to justify the following tentative conclusions:

1. There are definite family resemblances in occupational interests, as measured by the various scales of the Strong Vocational Interest Blank. The extent of these resemblances as indicated by the present data is represented by average coefficients of correlation of .50 for identical twins, and of .28 for fraternal twins.

2. Since it is certain that the interests of the monozygotic twins are more similar than those of the fraternal twins, and since the data suggest that there is no greater similarity of like-sex fraternal twins than of unlike-sex twins, it seems probable that hereditary factors are more important in determining interests than are environmental factors. This conclusion can only be made tentatively, however, since a part of the greater similarity of identical twins must be attributed to greater similarity of environment. The present writer believes that such greater similarity of environment is a fact which must be taken into consideration, but that it is a far less important fact than the greater similarity of heredity.

3. The present finding that male like-sex fraternal twins are, for this sampling at least, less similar than unlike-sex twins, raises several important questions. The finding is surprising in view of the common assumption that the interests of girls tend to be much different from those of boys. When all the data on male and female pairs are considered, a possible explanation is suggested. Girls may show less variability and less individuality than do boys, where occupational interests are concerned, and male fraternal twins may be in general less closely associated than are female fraternal twins, or even unlike-sex twins.

4. The greater similarity of all pairs on some of the interest scales may be partly the result of greater reliability of some of the scales, and also may be partly the result of differences in the specificity of the traits measured by those scales. It is also probable that the correlations are lower for those traits more affected by environmental influences. Further analysis is desirable, in order to answer these questions.

5. It is noteworthy that in these traits measured by these twenty-three scales, traits which there is every reason to believe are more affected by environmental factors than are such traits as general intelli-

gence, the correlations for related pairs of individuals are definitely lower than for most intellectual traits. This may be in part due to the unreliability of the measuring instruments, for although fair reliability has been reported for most of the scales, it must be kept in mind that we are here dealing with a younger group than that for which the test was devised. If the reliabilities are lower for such groups as this, it is probably an indication that environmental influences *do* affect the development of these interests. Developmental studies are necessary to supplement studies of the type here presented.

6. In view of previous literature on the subject, it is interesting to note that there seems to be no close relation between scores on these scales and chronological age, during the junior and senior high school period. That is, the correlations of scores with age for the age range from twelve to twenty are by no means so great as they would be for a trait such as general intelligence, or vocabulary, or ability in arithmetic. On the contrary, they approximate zero in magnitude. This finding may be partly explained by the construction of the test, the method of administering it, and the method of scoring. It is certain that there are great individual differences in scores at these young ages, and that they are not due to chronological age, nor in any way closely related to chronological age. It is admitted of course that the scores may be less valid as measures of vocational interests at this age level, but other considerations suggest that they measure stable traits of the individual.

7. The scores on the test are definitely related to intelligence test scores, but the correlations are not high enough to account for the findings regarding twin similarities. For some of the scales the correlations are negative, for some positive, and for some zero. These correlations are systematically related to type of interest, and they differ for boys and girls. Because of the lesser vocational information of these younger subjects, it is likely that these findings might differ somewhat from those which would be obtained for older groups.

8. It is important for the student of heredity to know that the greater similarity of monozygotic than dizygotic twins extends to traits such as these, and it is also important that the vocational counselor should know the facts concerning family resemblances in occupational interests. The present study may be considered useful as a preliminary investigation of the development of occupational interests.

REFERENCES

1. Dahlberg, Gunnar: "Twin Births and Twins from a Hereditary Point of View." Bokforlags A-B. Tidens Tryckeri, Stockholm, 1926, pp. 296 + 100.
2. Fryer, Douglas: "The Measurement of Interests." Henry Holt and Company, New York, 1931, pp. XXXVI + 488
3. Muller, H. J.: Mental Traits and Heredity, *Journal of Heredity*, Vol. 16, 1925, pp. 433-448.
4. Newman, H. H.: Studies of Human Twins. Part I, Methods of Diagnosing Monozygotic and Dizygotic Twins, *Biological Bulletin*, Vol. 55, 1928, pp. 287-297. Part II, Asymmetry Reversal or Mirror Imaging in Identical Twins, *Ibid.*, 55, pp. 298-315.
5. Siemens, H. W.: The Diagnosis of Identity in Twins, *Journal of Heredity*, Vol. 18, 1927, pp. 201-209.
6. Strong, E. K., Jr.: "Manual for the Vocational Interest Blank." Stanford University Press.
7. Strong, E. K., Jr.: "Change of Interests with Age." Stanford University Press, 1931, pp. XIX + 235.
8. Thurstone, L. L.: A Multiple Factor Study of Vocational Interests, *Personnel Journal*, Vol. X., Oct., 1931, pp. 198-205.