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4-H CLUB WORK : EFFECT ON CAPABILITY AND PERSONAL QUALITY

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4-H Club Work: Effect on Capability and Personal Quality

By D. E. LINDSTROM and W. M. DAWSON¹

DURING the past fifteen or twenty years 4-H club work has become more and more widespread, so that thousands of boys and girls between the ages of ten and twenty are now enrolled in the clubs in Illinois—twenty-three thousand of them in 1932, when the data for this study were gathered. Naturally the leaders of the movement have desired to discover, if possible, just how effective their work has been, and whether it is directed into the right channels. The present publication, an outgrowth of investigations made by a committee² appointed in 1930 to study 4-H club work in Illinois, analyzes (1) the extent to which 4-H club work increases the capability of the members, if at all; and (2) the extent to which the work develops desirable personal qualities in the members. An earlier analysis, also based on the work of this committee, and dealing with the

¹D. E. LINDSTROM, Assistant Chief in Rural Sociology; and W. M. DAWSON, formerly Assistant in Animal Husbandry, who was responsible for the more complicated statistical analyses, and has rendered other assistance in the preparation of the manuscript.

In addition to those whose connections with this study are shown in text or footnotes in the following pages, acknowledgment is due especially to Herbert Woodrow, Professor of Psychology, and C. W. Odell, Associate Professor of Education, for valuable suggestions and criticisms on certain phases of the study, particularly in relation to the multiple-factor analysis and the reliability of the tests; to G. S. Randall and Cleo Fitzsimmons, Specialists in Rural Youth Extension (formerly in Junior Club Work), for their aid in working out methods to test the reliability of the achievement tests; and to L. A. Wilson, formerly accountant in the Business Office of the University, for his assistance in developing the methods of statistical analysis used, especially the factorial analysis method. Gerald Hudson, graduate student in Rural Sociology, L. H. Scott and Marshall Harris, formerly Assistants in the Departments of Psychology and Agricultural Economics respectively, and Donald Wroughton, student in Chemistry, also aided in the study.

²This committee, appointed by Dean Herbert W. Mumford, consisted of the following persons: F. E. Longmire, Assistant State Leader of Farm Advisers, Chairman; Mary A. McKee, Extension Specialist in Junior Club Work; E. I. Pilchard, Extension Specialist in Junior Club Work; Mary Louise Chase, Assistant State Leader in Home Economics Extension; and D. E. Lindstrom. The committee secured valuable aid in its work from Coleman R. Griffith, Professor of Education; E. T. Hiller, Professor of Sociology; and from other members of these staffs.

factors which determine whether or not a boy or girl will become a member of a 4-H club, was published in 1936 under the title, "Selectivity of 4-H Club Work: An Analysis of Factors Influencing Membership" (Bulletin 426 of this Station).

PLAN OF THE STUDY

In the study of the selectivity of 4-H club work reported in Bulletin 426, the general plan for the entire study was described. For the convenience of those readers of the present publication who might not have the first report at hand, the descriptions of the tests and of the boys and girls to whom the tests were administered are repeated here.

Tests used. The objectives of 4-H club work may be broadly stated as being: first, to increase the capability of the boys and girls with reference partly to farm and home work and partly to citizenship in the community; and, second, to improve the personal quality of the boys and girls by developing or fostering desirable traits of character, social mindedness, honesty and integrity.

In the present study it was found impossible to measure the effectiveness of 4-H club work with regard to all of the points involved in these objectives. Measures were found or devised, however, which could be used with some degree of accuracy to indicate the effectiveness with which 4-H clubs are attaining some of the more important of these objectives. These measures were the following:¹

1. *Achievement tests*—measuring the degree to which boys or girls have acquired a knowledge of better farm and home practices.

2. *Attitude test*—measuring the attitude toward farm life.²

3. *Social-behavior test*—measuring tendencies to attend or take part in desirable or undesirable social functions.

4. *Ascendance-submission tests*³—measuring reactions to various social situations and indicating probable abilities for leadership and self-confidence.

5. *Organization index* (number of organizations belonged to and offices held)—showing something of the social inclination, leadership, cooperation, etc., of the individual.

¹A more complete description of these is given later at points where they are specifically considered.

²The original attitude scale measured appreciation and depreciation of farm life (Attitude I). A new scale worked out from the same data measured interest in the possibilities of farm life (Attitude II).

³The *Allport Ascendance-Submission Tests* were used.

6. *Prize index*—indicating the extent to which the individual has won prizes and awards.¹

In addition to these tests, each individual boy or girl in the study was given the Otis intelligence test; and data were collected, by questionnaires, on his status in the 4-H club, his age, occupational preferences, self-rating attitude, agricultural training (both as to projects taken in 4-H club work and subjects taken in school), reasons for not belonging to a 4-H club or, in the case of past members, for dropping out, and the size of the family of which he was a member, number of brothers and sisters, nativity and occupation of parents, and socio-economic status of the family. Thus means were obtained for measuring nineteen factors which might influence the scores made on the measures of objectives.

Subjects. Tests and measurements were administered to 2,301 boys and girls between the ages of 10 and 20 years² living in sixty communities in six counties³ in a diversified-farming section of Illinois, a section in which 4-H club work had been carried on as long as in any part of the state. Usable sets of data were obtained on 2,263 subjects:

Boy members.....	525
Boy past members.....	69
Boy nonmembers.....	446
Girl members.....	599
Girl past members.....	208
Girl nonmembers.....	416

Every effort was made to test comparable groups of members and nonmembers, for it was realized that any variation—as, for example, in the age of persons taking the achievement test—could be expected to influence the scores.

The boys and girls were brought to a central place thru the agency of the farm and home advisers and the local club leaders. Each club member and each past member invited to the meeting was asked to bring an acquaintance who was not a member but who was of about equal age and advancement in school. In this way a fairly satisfactory

¹The prize index was secured on members only, and hence could only be used to help measure differences between groups of members, e.g., those having high achievement scores compared with those having low achievement scores.

²A few past members and nonmembers were older than twenty years, and a few others were a few months younger than ten years.

³The authors acknowledge the cooperation and helpfulness of the farm and home advisers, county superintendents of public instruction, local public school superintendents, principals, and teachers, and the 4-H club leaders in these counties and communities in providing facilities and bringing the children together for the tests.

control group of nonmembers was obtained. By comparing the scores made by these comparable groups of members or past members and nonmembers it was believed that it would be possible to show the influence which 4-H club teaching had had on the members of the 4-H clubs. Furthermore, by comparing the scores of nonmember boys living in areas where no 4-H club work was available with the scores of members living in other comparable areas, one might arrive at a

TABLE 1.—SCORES OF FARM BOYS AND TOWN BOYS: AVERAGES MADE ON NINE VARIABLES BY MEMBERS AND NONMEMBERS

Variable	Scores of nonmembers			Scores of members		
	135 town boys	309 farm boys	Difference in favor of farm boys	57 town boys	527 farm boys	Difference in favor of farm boys
Age (months).....	173.9	173.8	— .1	180.2	183.1	+2.9
Intelligence quotient.....	100.1	99.2	— .9	98.8	98.3	— .5
Achievement.....	23.7	28.8	+5.1	29.5	39.1	+9.6
Ascendance-submission.....	36.3	34.9	—1.4	35.1	35.8	+ .7
Organization index.....	9.7	7.8	—1.9	10.7	10.6	— .1
Attitude I.....	4.9	4.2	+ .7*	4.2	3.8	+ .4*
Attitude II.....	31.4	31.4	0	....	37.8	....
Socio-economic status.....	45.0	47.5	+2.5	53.7	59.4	+5.7
Social behavior.....	10.3	10.8	+ .5	10.6	10.7	+ .1

*A low score is a favorable score for Attitude I; the difference is therefore in favor of the farm boys.

truer measure of the influence of club work on members; but in the present study the absence of a 4-H club was for so few nonmembers (only about 2 percent) the reason for not belonging to such a club, that it was not possible to make this comparison.

Inasmuch as the sample of members included all 4-H members living in the community at the time the test was made, irrespective of their age or length of time in 4-H club work, it was felt that the sample was as nearly random as it was possible to get.

Differences in the environment and the interests of boys and of girls made it necessary to give them different tests on achievement and on ascendance-submission, and consequently most of the data are reported separately for boys and for girls.

Differences between the environmental conditions of rural boys and girls living in towns and villages and those living on farms might also be expected to affect their interests and consequently their scores in some of the tests. Some indication of the effect of such differences is shown in Table 1. In the present study, however, this point was measured only with respect to the achievements and attitudes of the boys.

FACTORS STUDIED IN RELATION TO CAPABILITY

From the standpoint of the objectives of 4-H club work the attempt to measure the capability of these boys and girls was probably the most important aspect of this study. The term "capability," as used thruout this study, means the knowledge or mastery of the farming and home-making practices taught in 4-H club work. Capability was measured by means of achievement tests and "prize indexes." An attempt was then made by means of analysis to measure the influence of several factors in determining achievement. These factors were: 4-H club training, general adaptability to farm life, agricultural or home-economics training in high school, and attitudes toward farm life and its possibilities.

In general, capability as measured by both the achievement test and prize indexes was found to be increased by 4-H club work, especially among the boys who had not taken agricultural training in high school and the girls who had not taken home economics in high school. But the indirect effect of 4-H club training on capability (achievement), brought about by improving the adaptability of members to farm life or improving their attitudes toward farm life and its possibilities, was not so strong as was expected.

General Influence of 4-H Club Work

Boys. The boys' achievement test¹ consisted of one hundred true or false statements of farm practices concerning livestock (general), poultry, sheep, dairy, beef, swine, crops (general), legumes, long-row garden, corn, and potatoes. The total score given each paper was the number of statements marked correctly minus the number marked incorrectly. The reliability of this test was quite satisfactory (coefficient of reliability was + .843 when corrected by Brown's formula²), considering the reliability usually obtained for tests of a similar nature.

Scores made by the boys on the achievement test were distributed in approximately a normal curve, tho there was a slight skewness toward the lower scores. Distribution of scores made by members, however, differed significantly from the distribution of scores made by nonmembers (Fig. 1). The average score for members was 38.45, while that for nonmembers was 27.34. The average difference was thus

¹Prepared by Marshall Harris, formerly Assistant in Agricultural Economics, in consultation with specialists in junior club work and with staff members in the subject-matter departments.

²The reliability coefficient was worked out by G. S. Randall, Specialist in Rural Youth Extension (formerly in Junior Club Work).

$11.11 \pm .768$, which is 14.5 times its probable error and therefore statistically significant.¹ This marked difference in scores is evident thruout practically the whole range of the two distributions shown in Fig. 1. Distribution of scores of past members, not shown in Fig. 1, was usually intermediate between those of members and nonmembers.

That the achievement scores of member boys were, on the average, definitely higher than those of the nonmember boys might at first be

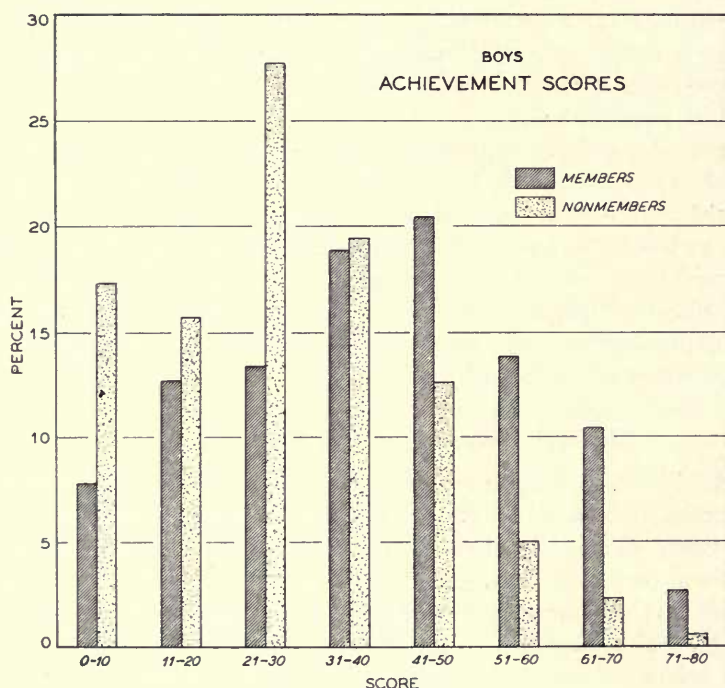


FIG. 1.—DISTRIBUTION OF SCORES MADE BY BOYS ON ACHIEVEMENT TESTS

taken to indicate a marked effect of 4-H club training. But before a conclusion of this sort can be safely drawn, other possible differences in the two groups which might affect the achievement score should be ascertained and weighed. That the member and the nonmember groups did differ significantly in age, organization index, Attitude I (appreciation or depreciation of farm life), socio-economic status, Attitude II

¹A difference three times its probable error is usually considered significant in statistical procedure (see Bulletin 423, p. 253).

TABLE 2.—BOY MEMBERS AND NONMEMBERS: AVERAGE SCORES ON TWELVE VARIABLES

Variable		Members (total number = 525)	Nonmembers (total number = 446)	Difference*	D/P.E.
A	Years in 4-H club.....	2.65 ± .043	.....	.....	.....
B	Size of family.....	6.11 ± .063	5.93 ± .069	+ .18 ± .093	1.9
C	Age (months).....	182.60 ± .758	174.09 ± .769	+ 8.51 ± 1.080	7.9
D	Intelligence quotient.....	98.47 ± .384	99.56 ± .437	- 1.09 ± .574	1.9
E	Achievement.....	38.46 ± .552	27.34 ± .515	+11.12 ± .768	14.5
F	Ascendancy-submission.....	35.99 ± .391	35.26 ± .456	+ .73 ± .607	1.2
G	Organization index.....	10.66 ± .226	8.37 ± .212	+ 2.29 ± .310	7.4
I	Parental organization index	4.33 ± .221	3.41 ± .134	+ .92 ± .258	3.6
K	Attitude I.....	3.77 ± .048	4.45 ± .059	+ .68 ^b ± .071	9.6
L	Socio-economic status.....	59.38 ± .562	47.17 ± .609	+12.21 ± .829	14.7
M	Social behavior.....	10.72 ± .043	10.57 ± .053	+ .15 ± .068	2.2
N	Attitude II.....	37.53 ± .033	32.66 ± .043	+ 4.87 ± .275	17.7

*A positive sign indicates a difference in favor of members; a negative sign, in favor of nonmembers.

^bA low score on Attitude I indicates a more favorable attitude than a high score; consequently the difference here is in favor of members.

(interest in the possibilities of farming),¹ and possibly in parental organization index is clearly shown in Table 2. Also the simple correlation coefficients and the standard regression coefficients (Tables 3, 4, and 5) show that some of these factors, notably age and intelligence, were quite highly correlated with achievement.

Some differences in scores were found between town and farm boys (Table 1), but these were not sufficiently significant to warrant separate analyses. It is interesting to note, however, that farm boys—both members and nonmembers—had higher achievement, socio-economic, Attitude I, and social-behavior scores; that town boys had higher organization indexes and intelligence quotients; and that farm-

¹The attitude test originally administered to measure appreciation or depreciation of farm life revealed practically no association between attitude and achievement. Upon further analysis, however, it was found that the attitude test measured more than one attitude and that one of these tentatively named "interest in the possibilities of farming and farm life," and referred to as Attitude II, was associated with achievement. This second attitude is the one used in this part of the analysis rather than the attitude expressing appreciation or depreciation of farm life. In calculating Attitude II two different sets of weightings for the statements were used. One system was based on factor loadings obtained by a factor analysis which included 22 statements from the original list of 24 (see footnote to Table 27, page 330), and other variables as listed in Table 23, page 321. Since the number of years in a 4-H club is one of the variables included, it is likely that the use of this rating scale for nonmembers is faulty. For this reason another system of scoring Attitude II, whereby the score was obtained by a factor analysis using only the 22 statements themselves, was worked out. Comparable factors were used in these two scoring systems on the basis of the criterion used in identifying Attitude II; namely, the relative sizes of loadings on statements, as indicated on page 321. Differences in means of Attitude II in the various tables are explained by this use of different methods in obtaining scores. See page 317, footnote 2, for a list of statements used.

TABLE 3.—BOY MEMBERS AND NONMEMBERS: PRODUCT-MOMENT CORRELATIONS BETWEEN VARIABLES

Variable	A	B	C	D	E	F	G	I	K*	L	M
525 members											
Years in 4-H club.....	-.017	+.369	-.022	+.351	+.158	+.292	+.169	+.198	+.206	+.023
Size of family.....	+.028	-.067	-.008	-.034	-.027	+.050	+.009	-.022	+.042
Age.....	-.041	+.575	+.188	+.481	+.049	+.013	+.013	+.022
Intelligence quotient.....	+.409	-.085	+.201	+.152	-.004	+.087	+.124
Achievement.....	+.116	+.426	+.110	+.175	+.058	+.125
Ascendence-submission.....	+.219	+.016	+.089	+.096	-.061
Organization index.....	+.226	+.044	+.210	+.037
Parental organization index.....	+.088	+.321	+.018
Attitude I*.....	+.067	+.049
Socio-economic status.....	-.005
Social behavior index.....
Standard deviation.....	1.5	2.1	25.7	13.1	18.8	13.3	7.7	7.5	1.6	19.1	1.4
Mean.....	2.6	6.1	182.6	98.5	38.5	36.0	10.7	4.3	3.8	59.4	10.7
446 nonmembers											
Size of family.....	+.008	-.153	-.087	-.025	-.016	-.021	-.042	-.086	-.036
Age.....	-.052	+.423	+.121	+.364	+.004	-.080	+.010	-.007
Intelligence quotient.....	+.417	+.071	+.166	+.145	+.144	+.139	+.139
Achievement.....	+.021	+.144	+.028	+.077	+.032	+.146
Ascendence-submission.....	+.180	+.076	+.108	+.119	-.058
Organization index.....	+.354	+.200	+.200	+.039
Parental organization index.....	+.042	+.306	+.044
Attitude I*.....	+.068	-.080
Socio-economic status.....	+.045
Social behavior index.....
Standard deviation.....	2.2	2.2	24.1	13.7	16.1	14.3	6.6	4.2	1.8	19.1	1.7
Mean.....	5.9	5.9	174.1	99.6	27.3	35.3	8.4	3.4	4.5	47.2	10.6

*The sign K was changed because a low numerical score in the test was a favorable score while a high numerical score was an unfavorable score.

TABLE 4.—FARM-BOY MEMBERS AND PAST MEMBERS: PRODUCT-MOMENT CORRELATIONS* BETWEEN VARIABLES
(527 farm boys)

Variable		A	C	D	E _i	F	G	L	M	P*	T*	N
A	Years in 4-H club.....	.....	+.368	+.001	+.355	+.161	+.262	+.218	+.053	+.420	+.416	+.089
C	Age.....	.....	.....	-.059	+.597	+.192	+.467	+.022	+.040	+.165	+.576	+.258
D	Intelligence quotient.....	.....	.....	.....	+.393	-.060	+.202	+.141	+.215	+.075	-.082	+.230
E	Achievement.....	.....	.....	.....	.....	+.114	+.436	+.073	+.150	+.192	+.618	+.353
F	Ascendancy-submission.....	.....	.....	.....	.....	.....	+.234	+.107	-.039	+.117	+.138	+.098
G	Organization index.....	.....	.....	.....	.....	.....	.....	+.203	+.055	+.067	+.453	+.202
L	Socio-economic status.....	.....	.....	.....	.....	.....	.....	.....	-.019	+.180	-.025	+.037
M	Social behavior.....	.....	.....	.....	.....	.....	.....	.....	.....	-.100	-.079	+.098
P	Prize index*.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+.102	+.028
T	Training.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N	Attitude II.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard deviation.....		1.5	26.6	13.4	18.5	13.1	7.5	18.6	1.6	.....	.....	5.8
Mean.....		2.6	182.7	98.3	39.1	35.8	10.6	59.4	10.7	.....	.....	37.8

*Tetrachoric correlations for prize index and training.

boy members had higher ascendance-submission scores than town-boy members, but that the ascendance-submission scores made by the farm-boy nonmembers were lower than those made by the town-boy nonmembers. When comparing scores made by town-boy members and town-boy nonmembers, differences in achievement, organization index, socio-economic status, Attitude I, and age were in favor of the members. The sample was so small, however, that caution should be exercised in drawing conclusions from these findings until they are tested by use of larger samples and more refined methods of analysis.

TABLE 5.—BOY MEMBERS AND NONMEMBERS: ASSOCIATION OF VARIABLES WITH ACHIEVEMENT^a AS INDICATED BY THE RATIO OF EACH STANDARD REGRESSION COEFFICIENT TO THE SUM^b OF THE STANDARD REGRESSION COEFFICIENTS

Variable	Members (525)		Nonmembers (446)	
	Standard regression coefficient	Percentage	Standard regression coefficient	Percentage
Years in 4-H club.....	+ .14426 ^a	10.7	.....	.....
Size of family.....	+ .00790	.6	-.03081	2.4
Age.....	+ .49867 ^a	36.8	+ .47829 ^a	37.3
Intelligence quotient.....	+ .42265 ^a	31.2	+ .45245 ^a	35.2
Ascendance-submission.....	+ .01982	1.5	-.04064	3.1
Organization index.....	+ .05890	4.4	-.07296	5.7
Parental organization index.....	-.01687	1.2	-.00080	.1
Attitude I.....	+ .10225 ^d	7.6	+ .09109 ^d	7.1
Socio-economic status.....	-.03036	2.2	-.03627	2.8
Social behavior.....	+ .05201	3.8	+ .08063 ^d	6.3
Total.....	1.35369 ^b	100.0	1.28394 ^b	100.0

^aAchievement score equals the number of correct answers minus the number of incorrect answers.

^bArithmetical sum of the numbers without their signs. ^cHighly significant. ^dSignificant.

Altho by a multiple-correlation analysis some idea could be formed of the degree to which some of these factors were associated with achievement, and tho the correlations could be checked by means of the regression equations,¹ the results from this method of analysis were not entirely satisfactory because of the intercorrelation of many of the variables (Tables 3, 4, and 5).

¹The variables represented by *A*, *B*, *C*, etc. in the following regression equations are given in Table 2. The sign *K* was changed in Table 2. In order, however, to use the regression equations with the attitude test as given, the sign must be changed back again. The regression equations for achievement and Attitude I of the boy members and nonmembers were the following:

Members..... $E = 1.830A + .387C + .615D + 1.143K + .671M - 121.090$
 $E = 38.445$

Nonmembers..... $E = .309C + .537D + 1.511K + .700M - 93.933$
 $E = 27.343$

Members..... $K = .010E + .172A + 2.933$
 $K = 3.773$

Nonmembers..... $K = .015E - .068G + 4.629$
 $K = 4.525$

It is interesting to note, however, that a multiple correlation of $+ .826$ was obtained between achievement as the dependent variable, and age, I.Q., number of years in 4-H club work, organization index (not including 4-H club), high-school training in agriculture, social behavior, ascendance-submission, socio-economic status, prize index, and Attitude II (interest in the possibilities of farming). This high correlation indicates that a considerable part of the variability in achievement scores can be accounted for by the relation existing between these variables and achievement. Simple correlations between achievement and these various factors, obtained by using the scores of the 527 farm-boy members and past members, were: training, $+ .618$; age, $+ .597$; organization index, $+ .436$; I.Q., $+ .393$; years in 4-H club work, $+ .355$; and Attitude II, $+ .353$ (Table 4). These variables apparently were responsible for the high multiple correlation ($+ .826$), and consequently for most of the variability in achievement scores.

Thus, even tho the members' achievement scores were significantly higher than the nonmembers' achievement scores, the conclusion cannot be drawn that 4-H club work was entirely responsible for the difference.

Girls. The girls' achievement test¹ consisted of 90 exercises of three choices each—36 exercises on clothing, 36 on foods, and 18 on room improvement.² When corrected by Brown's formula, the coefficient of reliability for the girls' achievement test was $+ .883$.³

Girl members made slightly higher achievement scores than girl nonmembers (Fig. 2). The average scores were for members $46.22 \pm .415$, and for nonmembers $44.26 \pm .628$ (Table 6). The difference of $1.96 \pm .628$ is probably significant, being 3.1 times its probable error. But inasmuch as the two groups differed significantly in age, ascendance-submission, parental organization index, Attitude I (appreciation or depreciation of farm life), and socio-economic status (Table 6), it was necessary to determine the relationship between these other variables and the achievement score before drawing conclusions upon the amount of differences in achievement or the extent to which these differences were due to 4-H club membership.

¹Prepared by Cleo Fitzsimmons, formerly Extension Specialist in Junior Club Work, in consultation with staff members in the subject-matter departments.

²Achievement, as originally scored, equaled the number of statements marked correctly minus the number marked incorrectly. Where the term "total achievement" is used, the score equals the number of statements marked correctly minus *half* the number marked incorrectly. The correlation between these two methods of scoring is very high ($+ .928$).

³Calculated by Cleo Fitzsimmons, using total achievement scores.

TABLE 6.—GIRL MEMBERS AND NONMEMBERS: AVERAGE SCORES ON TWELVE VARIABLES

Variable		Members (n = 599)	Nonmembers (n = 416)	Difference*	D/P.E.
A	Years in 4-H club.....	2.29 ± .038	.....	.....	....
B	Size of family.....	5.83 ± .059	6.14 ± .075	-.31 ± .095	3.3
C	Age (months).....	167.61 ± .665	172.50 ± .803	-4.89 ± 1.043	4.7
D	Intelligence quotient.....	103.84 ± .370	101.89 ± .440	+1.95 ± .575	3.4
E	Achievement ^b	46.22 ± .415	44.26 ± .471	+1.96 ± .628	3.1
F	Ascendance-submission.....	48.49 ± .377	45.60 ± .472	+2.89 ± .604	4.8
G	Organization index.....	9.35 ± .185	8.56 ± .209	+.79 ± .279	2.8
I	Parental organization index.....	6.07 ± .181	4.08 ± .170	+1.99 ± .248	8.0
K	Attitude I.....	4.13 ± .049	4.53 ± .062	-.40 ± .078 ^c	5.1
L	Socio-economic status.....	54.54 ± .579	48.50 ± .679	+6.04 ± .892	6.8
M	Social behavior.....	10.80 ± .041	10.71 ± .051	+.09 ± .654	.1
N	Attitude II.....	38.61 ± .016 ^d	38.57 ± .032	+.04 ± .219	.2

*A positive sign indicates a difference in favor of the members; a negative sign, in favor of the nonmembers. ^bAchievement as originally scored (see footnote 2, page 285). ^cA low score on Attitude I indicates a more favorable attitude than a high score; consequently the difference here is in favor of the members. ^dNo distinction is made in this score between members and past members. There were 768 girls in this group.

The girls' achievement scores were positively related to Attitude II (interest in the possibilities of farm life), as was true also of the boys' achievement scores. For girl members and past members the correlations of total achievement with each of 16 other variables were as follows:

	<i>Coefficients of correlation with total achievement</i>
Years in 4-H club.....	+.310
Age.....	+.566
Intelligence quotient.....	+.408
Achievement (as originally scored).....	+.928
Ascendance-submission.....	+.169
Organization index.....	+.438
Attitude I.....	+.224
Socio-economic status.....	-.062
Social behavior.....	+.063
Attitude II.....	+.458
Prize index.....	+.278
School training.....	+.219
4-H training in clothing.....	+.344
4-H training in foods.....	+.094
Clothing achievement.....	+.845
Foods achievement.....	+.865

According to the foregoing simple correlation coefficients and those in Table 7, the achievement scores of both members and nonmembers were positively related to age, I.Q., and organization index, and the scores of the members were positively related also to number of years of membership in a 4-H club. Attitude II was also correlated positively with achievement in a combined sample of girl members and past members (Table 8).

Both age and I.Q., of the girl members were significantly correlated

with achievement, according to the standard regression coefficients obtained by using achievement as the dependent variable (Table 9). Age, I.Q., and organization index of the nonmembers also appeared to be significantly correlated with achievement when the other variables

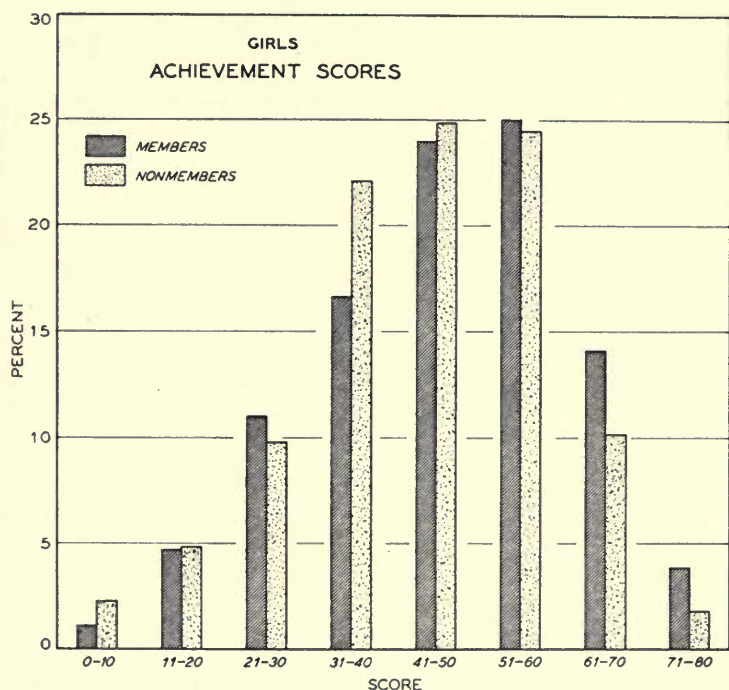


FIG. 2.—DISTRIBUTION OF SCORES MADE BY GIRLS ON ACHIEVEMENT TESTS

were controlled. It must be remembered, however, that the statistical control used in obtaining these coefficients was based on the assumption that the so-called independent variables were not intercorrelated—which in this case was not entirely true (Table 7). But since most of these intercorrelation coefficients are quite low, the standard regression coefficients may be considered to indicate the relationship which actually existed.

When age, I.Q., organization index, and Attitude II were controlled, there were no significant differences between the achievement scores of girl members and of girl nonmembers. Such differences as occurred were largely in favor of the members, and the cases in which the differences approached significance were consistently in favor of the members (Table 10).

TABLE 7.—GIRL MEMBERS AND NONMEMBERS: PRODUCT-MOMENT CORRELATIONS BETWEEN VARIABLES

Variable		A	B	C	D	E*	F	G	I	K	L	M
599 members												
A	Years in 4-H club.....	.....									
B	Size of family.....	.....	-.046	+.417	+.000	+.291	+.135	+.303	+.240	+.055	+.235	+.018
C	Age.....	.....	.....	-.006	-.134	-.055	-.079	-.088	+.018	+.101	-.076	+.040
D	Intelligence quotient.....	.....	.....	.....	-.126	+.354	+.167	+.451	+.073	+.063	+.168	+.063
E	Achievement*.....	.....	.....	.....	.....	.....	+.002	+.191	+.106	-.022	+.206	+.094
F	Ascendence-submission.....	.....	.....	.....	.....	.....	+.151	+.378	+.134	+.023	+.181	+.100
G	Organization index.....	.....	.....	.....	.....	.....	.....	+.259	+.043	+.058	+.100	+.060
H	Parental organization index.....	.....	.....	.....	.....	.....	.....	.....	+.282	+.014	+.248	+.059
I	Attitude I.....	.....	.....	.....	.....	.....	.....	.....	.....	-.133	+.307	+.087
J	Socio-economic status.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+.057	+.020
K	Social-behavior index.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+.015
L	Standard deviation.....	1.4	2.1	24.1	13.4	15.1	13.7	6.7	6.6	1.8	21.0	1.5
M	Mean.....	2.3	5.8	167.6	103.8	46.2	48.5	9.4	6.1	4.1	54.5	10.8
416 nonmembers												
B	Size of family.....	.....									
C	Age.....	.....	.....	-.041	-.074	-.010	+.066	-.099	-.075	-.074	-.035	+.017
D	Intelligence quotient.....	.....	.....	.....	-.220	+.052	+.048	+.392	-.015	+.005	+.044	+.016
E	Achievement*.....	.....	.....	.....	.....	+.297	+.073	-.236	+.192	-.009	+.178	+.032
F	Ascendence-submission.....	.....	.....	.....	.....	.....	+.149	+.429	+.120	-.005	+.146	+.009
G	Organization index.....	.....	.....	.....	.....	.....	.....	+.176	+.051	+.031	+.108	+.094
H	Parental organization index.....	.....	.....	.....	.....	.....	.....	.....	+.222	+.020	+.274	+.021
I	Attitude I.....	.....	.....	.....	.....	.....	.....	.....	.....	-.050	+.310	+.067
J	Socio-economic status.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+.045	+.128
K	Social-behavior index.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	+.001
L	Standard deviation.....	.....	2.3	24.3	13.3	14.2	14.3	6.3	5.1	1.9	20.5	1.5
M	Mean.....	.....	6.1	172.5	101.9	44.3	45.6	8.6	4.1	4.5	48.5	10.7

*Achievement as originally scored.

TABLE 8.—GIRL MEMBERS AND PAST MEMBERS: PRODUCT-MOMENT CORRELATIONS BETWEEN SEVENTEEN VARIABLES
(768 girls)

Variable	A	C	D	E*	F	G	K	L	M	N	O†	P†	Q†	R†	S	T	U
Years in 4-H club.....	+.301	+.009	+.301	+.106	+.222	+.226	-.054	-.022	+.154	+.316	+.106	+.744	+.314	+.295	+.262	.310
Age.....	-.169	+.541	+.141	+.424	+.064	-.016	+.041	+.333	+.135	+.281	+.321	+.043	+.486	+.508	.566
Intelligence quotient.....	+.362	+.073	+.164	+.236	+.013	+.034	+.217	+.165	+.002	+.039	+.054	+.379	+.307	.408
Achievement*.....	+.177	+.406	+.173	+.038	+.047	+.394	+.247	+.217	+.313	+.091	+.757	+.824	.928
Ascendancy-submission.....	+.273	+.134	-.020	-.076	+.175	+.151	+.091	+.076	+.037	+.156	+.134	.169
Organization index.....	+.199	+.033	+.053	+.335	+.136	+.128	+.228	+.074	+.352	+.410	.438
Attitude I.....	+.021	+.009	+.140	+.163	+.040	+.203	+.082	+.197	+.167	.224
Socio-economic status.....	-.012	-.097	-.078	+.033	-.039	-.083	-.035	-.070	.062
Social behavior.....	+.101	+.027	-.023	+.021	-.022	+.042	+.057	.063
Attitude II.....	+.169	+.103	+.160	+.074	+.377	+.400	.458
Prize index†.....	+.028	+.293	+.137	+.258	+.196	.278
School training†.....	+.050	+.077	+.159	+.240	.219
4-H training in clothing†.....	+.365	+.279	.344
4-H training in food†.....	+.043	+.140	.094
Clothing achievement.....	+.599	.845
Foods achievement.....865
Total achievement.....

*As originally scored.

†Tetrachoric correlations for variables O, P, Q, and R.

Inasmuch as most of the girl members were somewhat younger than the nonmembers and yet had a higher average score, it would be expected, considering the above correlations, that differences in the achievements of girl members and nonmembers would be somewhat increased in favor of the members if the two groups were of compar-

TABLE 9.—GIRL MEMBERS AND NONMEMBERS: ASSOCIATION OF VARIABLES WITH ACHIEVEMENT^a AS INDICATED BY THE RATIO OF EACH STANDARD REGRESSION COEFFICIENT TO THE SUM^b OF THE STANDARD REGRESSION COEFFICIENTS

Variable	Members		Nonmembers	
	Standard regression coefficient	Percentage	Standard regression coefficient	Percentage
Years in 4-H club.....	+.04849	3.9	.....	....
Size of family.....	+.01063	.9	+.04849	3.9
Age.....	+.55651 ^c	45.2	+.54156 ^c	43.9
Intelligence quotient.....	+.43529 ^c	35.4	+.38234 ^c	31.0
Ascendance-submission.....	+.05219	4.2	+.06961	5.6
Organization index.....	+.01303	1.1	+.10976 ^d	8.9
Parental organization index.....	+.04078	3.3	+.02860	2.3
Attitude I.....	-.01290	1.0	+.01586	1.3
Socio-economic status.....	-.03664	3.0	+.00981	.9
Social behavior.....	+.02375	1.9	-.02626	2.1
Total.....	1.23021 ^b	99.9	1.23229 ^b	99.9

^aAchievement score equals the number of correct answers minus the number of incorrect answers.
^bArithmetical sum of the numbers without their signs. ^cHighly significant. ^dSignificant.

able ages. This increase would be partly offset if the groups were comparable in intelligence, but even so a slight increase in favor of members would probably remain.

Adaptability to Farm Life

Boys. By using the method of analysis developed by L. L. Thurstone¹ and modified by Herbert Woodrow and Lawrence A. Wilson,² achievement and the variables mentioned as having the higher simple correlation coefficients with achievement, except I.Q., were all found to be associated to a considerable degree thru a common factor which may be called "adaptability to farm life" (Factor I, Table 11). Only a slight association was found between this general factor of adaptability to farm life and I.Q.; and in the factor analysis the latter was largely associated with a second factor which may be called an intelligence factor (Factor II, Table 11). Achievement, Attitude

¹L. L. Thurstone, *The Theory of Multiple Factors*, Edwards Brothers, Inc., Ann Arbor, Michigan, 1933.

²Herbert Woodrow and Lawrence A. Wilson, "A Simple Procedure for Approximate Factor Analysis," in *Psychometrika*, 1, 245-258, 1936.

TABLE 10.—GIRL MEMBERS AND NONMEMBERS: DIFFERENCES IN AVERAGE ACHIEVEMENT SCORES* WHEN AGE, I.Q., ORGANIZATION INDEX, AND ATTITUDE II ARE CONTROLLED

Group	Number in group	Age (months)	I.Q.	Organization index	Attitude II	Achievement scores	P.E.	Difference	D P.E.
Nonmembers...	44	153.23	89.18	2.80	34.80	15.86	± 1.0192		
Members.....	89	149.35	91.61	3.34	34.50	19.62	± .7359	+3.76	2.99
Nonmembers...	4	155.00	100.00	3.00	45.00	26.75	± 3.6165	-7.08	1.64
Members.....	12	145.50	92.08	4.25	43.33	19.67	± 2.3454		
Nonmembers...	6	155.33	93.67	10.33	35.33	22.67	± 3.1129	-1.22	.35
Members.....	31	147.87	93.65	11.74	34.23	21.45	± 1.6335		
Nonmembers...	4	162.50	93.50	11.00	45.00	29.00	± 2.6410	-3.17	.92
Members.....	6	157.33	97.67	13.00	43.33	25.83	± 2.2200		
Nonmembers...	46	145.57	113.89	3.85	34.96	27.63	± 1.1693		
Members.....	104	147.00	112.94	4.37	35.35	28.16	± .6726	+ .53	.39
Nonmembers...	15	149.87	115.00	6.00	43.73	34.27	± 2.1043		
Members.....	30	154.13	117.00	5.00	44.10	39.60	± 1.3468	+5.33	2.13
Nonmembers...	22	147.82	119.41	11.77	36.63	30.68	± 1.7199	- .34	.17
Members.....	56	148.68	114.21	12.57	35.84	30.34	± 1.0192		
Nonmembers...	6	159.00	119.00	11.33	42.50	41.67	± 2.1400	-4.75	1.79
Members.....	25	154.16	117.28	12.44	43.56	36.92	± 1.5674		
Nonmembers...	62	184.35	91.22	4.66	35.40	28.42	± .7592		
Members.....	60	183.70	90.47	5.18	35.35	31.53	± 1.0975	+3.11	2.33
Nonmembers...	14	184.00	95.21	5.00	44.14	30.93	± 1.9479		
Members.....	38	188.95	93.58	5.24	43.71	36.63	± 1.3262	+5.70	2.42
Nonmembers...	34	190.82	92.53	14.82	36.41	33.82	± 1.0950		
Members.....	74	190.38	93.53	13.68	36.32	35.41	± .7275	+1.59	1.21
Nonmembers...	28	190.71	95.00	14.04	44.54	40.00	± 1.4674		
Members.....	53	194.60	94.26	16.47	43.55	41.04	± 1.0024	+1.04	.59
Nonmembers...	13	187.38	107.38	5.38	36.23	34.69	± 1.3072		
Members.....	38	184.16	108.76	5.21	36.58	39.32	± 1.4674	+4.63	2.36
Nonmembers...	14	185.00	108.07	5.00	44.36	38.50	± 1.7035		
Members.....	23	186.70	111.65	5.91	45.13	45.09	± 1.6821	+6.59	2.75
Nonmembers...	18	192.33	110.39	16.22	36.44	44.33	± 1.7470		
Members.....	42	186.19	110.76	14.90	37.05	45.88	± .7829	+1.55	.81
Nonmembers...	39	192.00	114.31	17.59	44.87	48.28	± 1.1026		
Members.....	87	190.18	113.26	18.01	44.60	50.57	± .7835	+2.29	1.69

*Achievement score equals the number of right answers minus half the number wrong.

II (interest in the possibilities of farming and farm life), and social behavior were all associated to some extent with the intelligence factor; while the number of years in 4-H club work was quite definitely not associated with this factor, but rather was opposed to it.

Tho in making the above analysis only the data pertaining to the farm-boy members and past members were used, it was considered probable that the results could be applied also to the data for the farm-boy nonmembers, at least to the extent of selecting the variables to be controlled. A similar analysis of the data for the farm-boy nonmem-

bers confirmed the belief that the results would be comparable, as is shown by the following lists of factor loadings:¹

Variable	Factor I	
	Nonmembers	Members
Years in 4-H club work.....	.....	+.565
Age.....	+.522	+.659
Intelligence quotient.....	+.381	+.296
Achievement.....	+.761	+.793
Ascendance-submission.....	+.102	+.265
Organization index.....	+.117 ^a	+.623 ^a
Socio-economic status.....	-.011	+.236
Social behavior.....	+.151	+.120
Prize index.....	.....	+.329
Training.....	+.433	+.605
Attitude II.....	+.429	+.400

(*The very marked difference between the size of loadings on organization index for the nonmembers and for the members is to be expected when the low score of the nonmembers is considered.)

Only farm-boy members and past members of 4-H clubs (527) were used in the above factorial analysis, since the scores of the town boys differed in several respects from those of the farm boys. The 527 scores were those of 468 members plus 69 past members minus 10 incomplete on attitude (Table 16, page 301).

Girls. Among both girl members and past members, achievement (both total score and scores for parts of the test), age, number of years in 4-H club work, organization index, 4-H club training in clothing, and Attitude II were all associated to a considerable extent thru a common factor of a multiple-factor analysis² (Factor I, Table 12). This factor may be interpreted as a general-adaptability factor along the lines covered by the achievement test, and the above-mentioned variables may be considered to be in a greater or less degree measures of it. On the other hand, social behavior, socio-economic status, and 4-H club training in foods appeared to have practically no association with this factor. None of the variables measured were highly opposed to it.

Number of years in a 4-H club and amount of 4-H club training, particularly in clothing, formed in combination the second major factor (Factor II, Table 12) measured by the data. Achievement and I.Q. were opposites to Factor II, according to the signs of the loadings.³

Number of years in 4-H club work apparently measures two things, since it carries high loadings of similar sign on both Factor I and Factor II. It is difficult to say just what each part does measure,

¹Not to be interpreted as correlation coefficients (see Bulletin 426, page 275).

²Similar to the multiple-factor analysis for boys (see page 290).

³See footnote 1, page 281, and Tables 27 and 28, pages 330 and 331.

however, beyond the fact that one is associated with achievement and to a less extent with I.Q., while the other is not. No high degree of association between the total or original scores for number of years in 4-H club work and achievement would be expected, therefore, since one part of the score for number of years in 4-H club work tends to offset the correlation with achievement shown by the other part.

TABLE 11.—FARM-BOY MEMBERS AND NONMEMBERS: FACTOR LOADINGS DETERMINED BY FACTORIAL ANALYSIS OF ELEVEN VARIABLES (527 farm boys)

Variable	Loadings on—	
	Factor I ^a (+)	Factor II ^b (-)
Years in 4-H club.....	+.565	-.345
Age.....	+.659	-.195
Intelligence quotient.....	+.296	+.528
Achievement.....	+.793	+.226
Ascendancy-submission.....	+.265	-.217
Organization index.....	+.623	-.099
Socio-economic status.....	+.236	-.108
Social behavior index.....	+.120	+.341
Prize index.....	+.329	-.254
Training.....	+.605	-.198
Attitude II.....	+.400	+.261

^aFactor I is interpreted to be a general factor for adaptability to farm life. ^bFactor II is interpreted to be an intelligence factor.

TABLE 12.—GIRL MEMBERS AND PAST MEMBERS: FACTOR LOADINGS DETERMINED BY FACTORIAL ANALYSIS OF SEVENTEEN VARIABLES (768 girls)

Variable	Factor loadings on—		
	Factor I ^a (+)	Factor II ^b (+)	Factor III ^c (-)
Age.....	+.584	+.080	+.537
Years in 4-H club.....	+.509	+.674	+.004
Intelligence quotient.....	+.340	-.359	-.524
Social behavior.....	+.054	-.026	+.002
Ascendancy-submission.....	+.256	+.101	+.110
Attitude I.....	+.318	+.120	-.283
Prize index.....	+.388	+.197	-.190
School training.....	+.247	-.025	+.185
Organization index.....	+.539	-.017	-.063
Clothing achievement.....	+.786	-.210	+.068
Foods achievement.....	+.803	-.249	+.161
Socio-economic status.....	-.077	-.040	+.052
4-H training (clothing).....	+.500	+.554	+.112
Total achievement.....	+.914	+.325	+.127
Attitude II.....	+.526	-.080	-.095
4-H training (foods).....	+.183	+.231	-.061
Achievement (as originally scored)....	+.856	-.308	+.168

^aFactor I is interpreted to be a factor for achievement or general adaptability to farm life.

^bFactor II is interpreted to be largely a factor for length of membership in the 4-H club.

^cFactor III relates age negatively with intelligence and attitude.

According to the loadings for Factor III, Table 12, age had as opposites I.Q. and Attitude I (appreciation or depreciation of farm life). Since there is no correlation between age and I.Q., this opposite relation between I.Q. and Attitude I is further evidence of the lack of association between Attitude I and achievement; indeed it indicates that among the older girls the negative correlation between these two variables is higher than among the younger girls, which in turn implies that the farther a girl advances in 4-H club work the less attractive farm life, as she has known it, becomes to her.

Special Training in School

Boys. The greatest differences in achievement scores were between members¹ and nonmembers who had not studied agriculture in high school. In general, members of 4-H clubs had higher average achievement scores than comparable nonmembers. This fact is clearly shown in the comparison of groups of members and nonmembers formed by controlling the other variables associated with achievement. The groups selected were as nearly comparable as was feasible with regard to age, I.Q., Attitude II, organization index, agricultural training in high school, and occupation of the fathers (Tables 13 and 14).

Differences in Total Scores.—In eleven of sixteen comparisons between members and nonmembers who had not studied agriculture in high school the members had the higher achievement scores. Furthermore in five of the eleven comparisons in favor of the members the differences were statistically significant, while in none of the five comparisons in favor of the nonmembers did the differences even approach significance. The groups having the most significant differences were distributed apparently at random so far as age, I.Q., Attitude II, and organization index were concerned. Thus for those who had not studied agriculture in high school there was a real difference in achievement in favor of the members, a difference which is not associated with age, I.Q., Attitude II, or organization index.

In nine of fifteen comparisons between 4-H club members and nonmembers who had studied agriculture in high school the members had the higher achievement scores. Tho the numbers in these groups were too few to determine the statistical significance of these differences, there was some indication that members tended to have higher achievement scores than nonmembers even when both groups had studied agriculture in high school. The difference was much less

¹No distinction is made between members and past members in the rest of the discussion on boys' achievement. The combined group is referred to as members.

TABLE 13.—FARM BOYS WHO HAD NOT HAD AGRICULTURE IN HIGH SCHOOL:
DIFFERENCES IN AVERAGE ACHIEVEMENT SCORES WHEN VARIABLES
ASSOCIATED WITH ACHIEVEMENT ARE CONTROLLED*

Group	Number in group	Age (months)	I.Q.	Attitude II	Organization index	Achievement score	Difference	D P.E.
Members.....	58	158	86	27.4	3.1	19.1 ± 1.22	+ 3.6 ± 1.52	2.4
Nonmembers...	54	160	86	24.2	3.2	15.5 ± .90		
Members.....	24	163	87	26.6	11.3	18.2 ± 1.98	- 2.6 ± 2.60	1.0
Nonmembers...	20	162	90	29.7	11.8	20.8 ± 1.68		
Members.....	28	166	90	36.6	4.9	24.7 ± 1.83	- 1.0 ± 2.99	.3
Nonmembers...	24	164	93	37.1	3.5	25.7 ± 2.36		
Members.....	14	171	92	36.6	12.3	34.3 ± 2.02	+11.5 ± 3.58	3.2
Nonmembers...	12	169	92	37.3	11.9	22.8 ± 2.95		
Members.....	32	147	111	28.6	4.1	26.1 ± 1.24	- 1.1 ± 2.02	.5
Nonmembers...	36	158	108	23.2	3.9	27.2 ± 1.60		
Members.....	20	164	108	27.7	14.0	34.5 ± 1.96	- 3.1 ± 2.92	1.1
Nonmembers...	17	167	112	30.1	11.9	37.6 ± 2.17		
Members.....	29	159	112	37.7	3.5	39.4 ± 1.73	+10.1 ± 2.56	4.0
Nonmembers...	22	157	114	37.3	4.3	29.3 ± 1.89		
Members.....	18	172	111	38.7	13.9	41.9 ± 1.36	+ 8.1 ± 2.48	3.3
Nonmembers...	16	169	113	38.1	13.7	33.8 ± 2.07		
Members.....	18	197	86	28.4	4.9	32.7 ± 1.75	+ 7.6 ± 3.98	1.9
Nonmembers...	7	194	89	28.3	4.9	25.1 ± 3.58		
Members.....	15	198	89	27.9	15.7	35.5 ± 3.39	+17.2 ± 3.80	4.5
Nonmembers...	7	206	86	27.1	15.0	18.3 ± 1.72		
Members.....	17	200	89	38.1	4.4	35.2 ± 2.81	- .7 ± 3.86	.2
Nonmembers...	14	200	91	38.9	4.8	25.9 ± 2.65		
Members.....	19	203	90	38.8	16.0	39.0 ± 2.28	+ 9.1 ± 3.76	2.4
Nonmembers...	13	203	91	38.5	16.5	29.9 ± 2.99		
Members.....	5	191	108	28.6	2.8	44.8 ± 2.37	+ 3.6 ± 3.13	1.2
Nonmembers...	4	190	102	29.8	6.0	41.2 ± 2.05		
Members.....	16	205	108	31.1	16.7	48.9 ± 2.26	+12.7 ± 3.31	3.8
Nonmembers...	9	204	113	28.7	17.1	36.2 ± 2.42		
Members.....	17	204	110	39.2	5.1	46.5 ± 1.80	+11.8 ± 4.22	2.8
Nonmembers...	7	198	110	35.1	3.0	34.7 ± 3.82		
Members.....	39	205	111	37.6	18.6	51.2 ± 1.54	+ 5.4 ± 2.88	1.9
Nonmembers...	12	202	113	40.5	16.2	45.8 ± 2.43		

*The control consisted of dividing the scores made on each variable into two groups. The division was made at approximately the average score for the member boys.

marked, however, among those who had agricultural training in school than among those who had no such training. When members and nonmembers were compared by using the sum of the differences in achievement scores for all the groups, both with and without agricultural training in school, the average difference was 5.4 points in favor of the members. This higher average score by the members held true both when the differences for the groups were given equal weightings and when they were weighted according to the proportion of number of boys in the group to the total number in the sample. The odds that this difference is real are approximately 390 to 1.

TABLE 14.—FARM BOYS WHO HAD HAD AGRICULTURE IN HIGH SCHOOL: DIFFERENCES IN AVERAGE ACHIEVEMENT SCORES WHEN VARIABLES ASSOCIATED WITH ACHIEVEMENT ARE CONTROLLED^a

Group	Number in group	Age (months)	I.Q.	Attitude II	Organization index	Achievement score	Difference
Members.	3	168	89	28.3	5.3	28.7	- 3.7
Nonmembers....	5	168	93	29.6	3.4	32.4	
Members.	5	174	94	28.0	16.8	39.8	+10.8
Nonmembers....	3	173	92	31.5	11.3	19.0	
Members.	5	166	94	39.8	7.2	32.2	-15.3
Nonmembers....	2	181	98	37.5	4.5	47.5	
Members.	5	178	92	38.8	14.8	48.6	+ 9.6
Nonmembers....	1	182	84	39.0	19.0	39.0	
Members.	2	168	104	19.5	5.0	44.0	- 4.5
Nonmembers....	2	165	119	30.5	3.0	48.5	
Members.	4	169	104	27.2	13.2	43.2	.....
Nonmembers....	0	...	...	....	....	....
Members.	3	169	106	37.7	5.0	40.0	- 4.0
Nonmembers....	2	179	104	39.0	3.5	44.0	
Members.	7	177	111	42.6	17.1	59.7	+25.7
Nonmembers....	1	178	110	37.0	23.0	34.0	
Members.	8	195	90	26.1	4.6	42.6	- 7.2
Nonmembers....	4	208	92	30.2	7.0	49.8	
Members.	17	206	91	30.8	17.4	52.5	+12.5
Nonmembers....	1	194	88	30.0	14.0	40.0	
Members.	12	206	90	39.5	4.3	49.4	+23.4
Nonmembers....	1	192	92	37.0	1.0	26.0	
Members.	38	208	91	38.9	17.4	51.3	+10.3
Nonmembers....	3	201	93	40.0	17.7	41.0	
Members.	2	188	106	27.5	4.5	59.5	+ 9.5
Nonmembers....	4	194	112	29.0	6.0	50.0	
Members.	14	205	109	30.7	19.9	59.9	+11.4
Nonmembers....	2	204	124	27.5	12.5	48.5	
Members.	4	201	107	40.8	8.5	59.2	- 8.8
Nonmembers....	1	186	119	51.0	5.0	68.0	
Members.	28	202	108	39.4	17.8	62.3	+16.6
Nonmembers....	3	205	107	42.0	14.0	45.7	

^aThe control consisted of dividing into two groups the scores made on each variable. The division was made at approximately the average score for the member boys.

Differences in Subject-Matter Scores.—A still further study was made of the differences in the achievement scores of members and nonmembers on the eleven different sections of the achievement test.¹

¹The divisions of the test were scored by subtracting half the number of wrong answers from the number of right answers and adding a constant to eliminate negative scores. Since in omitting a few ambiguous statements mentioned, some of the divisions were left with more statements than others, the constant added was not the same for all divisions, but was arbitrarily taken as the number of statements left in the division (general livestock, swine, and corn, 10; poultry, sheep, beef, general crops, long-row garden, and potatoes, 9; dairy and legumes, 8).

Comparisons were also made between members who had carried on a 4-H club project in the particular subject covered by the division and those who had not. For example, the average score made on the beef-cattle section of the achievement test by members who had carried on a 4-H club beef project was compared with the average score on the same section by members who had not carried such a project (Tables 15 and 16).

The largest and most significant differences in favor of 4-H club training were in the beef, sheep, and corn divisions of the test. This was especially true where the scores of members who had had a 4-H club project in the subject matter of the division were compared with the scores of members who had not.

Among the boys who *had not studied agriculture in high school* the 4-H club members who had not carried on a 4-H project in the subject matter of the division studied (Table 15) made higher scores in all eleven divisions of the achievement test than the nonmembers. In five of the eleven divisions (general livestock, poultry, general crops, legumes, and corn) the differences were definitely significant. In four of the remaining six divisions (sheep, beef, long-row garden, and potatoes) the differences were at least 2.3 times their probable errors, and therefore on the border line of statistical significance. Thus only in the dairy and swine divisions were the differences in favor of the members definitely too small to be significant. In all these comparisons the numbers in the groups were large, ranging from 226 to 407 boys per group. The average ages, intelligence quotients, organization indexes, Attitude II scores, and number of years in 4-H club work given in the tables for each group indicate that the groups were quite comparable in respect to these variables.

Also among those who had not studied agriculture in high school, the 4-H club members who had carried on a 4-H club project in the subject matter covered by the division of the achievement test being scored made higher scores than the nonmembers in the eight divisions on which comparisons could be made. In the sheep, beef-cattle, swine, and corn divisions the scores of the members were significantly higher. The average difference for the eight divisions was 1.05 points. But when nonmembers were compared with members who had not had a 4-H club project in the subject matter covered by the division the average difference was only .47 points.

Tho these averages were unweighted by the number of boys in the different divisions, they indicate that having a 4-H club project in a particular subject helped a boy make a better score on that subject.

TABLE 15.—FARM BOYS WHO HAD NOT HAD AGRICULTURE IN HIGH SCHOOL: DIFFERENCES IN AVERAGE ACHIEVEMENT SCORES ON VARIOUS DIVISIONS OF THE ACHIEVEMENT TEST

Group	4-H project in division	Number in group	Age (months)	I.Q.	Attitude II	Years in 4-H club	Total achievement	Achievement score, on division	Difference	D/P.E.
General livestock										
Members ^a	No	407	178	99	37	2.5	35.1	13.56 ± .10		
Nonmembers.....	...	285	174	99	31	...	27.8	12.90 ± .11	+ .66 ± .14	4.6
Poultry										
Members.....	No	373	178	99	37	2.4	35.0	14.43 ± .09		
Nonmembers.....	...	290	173	99	31	...	27.5	13.62 ± .10	+ .81 ± .14	5.8
Members.....	Yes	33	180	95	38	2.8	35.9	14.00 ± .45		
Nonmembers.....	...	290	173	99	31	...	27.5	13.62 ± .10	+ .38 ± .46	.8
Members.....	Yes	33	180	95	38	2.8	35.9	14.00 ± .45		
Nonmembers.....	No	373	178	99	37	2.4	35.0	14.43 ± .09	- .43 ± .46	.9
Sheep										
Members.....	No	387	178	98	33	2.4	35.0	11.89 ± .09		
Nonmembers.....	...	285	173	99	31	...	27.6	11.49 ± .12	+ .40 ± .15	2.6
Members.....	Yes	18	180	98	38	2.8	37.4	13.28 ± .31		
Nonmembers.....	...	285	173	99	31	...	27.6	11.49 ± .12	+1.79 ± .33	5.4
Members.....	Yes	18	180	98	38	2.8	37.4	13.28 ± .31		
Nonmembers.....	No	387	178	98	33	2.4	35.0	11.89 ± .09	+1.39 ± .32	4.3
Dairy cattle										
Members.....	No	339	178	98	37	2.3	34.1	9.81 ± .10		
Nonmembers.....	...	289	173	99	31	...	27.6	9.63 ± .09	+ .18 ± .13	1.4
Members.....	Yes	66	180	102	38	3.4	40.1	10.41 ± .28		
Nonmembers.....	...	289	173	99	31	...	27.6	9.63 ± .09	+ .78 ± .30	2.6
Members.....	Yes	66	180	102	38	3.4	40.1	10.41 ± .28		
Nonmembers.....	No	339	178	98	37	2.3	34.1	9.81 ± .10	+ .60 ± .30	2.0

^aIn this table the term members includes past members also.

(Table is continued on next page.)

TABLE 15—Continued

Group	4-H project in division	Number in group	Age (months)	I.Q.	Attitude II	Years in 4-H club	Total achievement	Achievement score on division	Difference	D/P.E.
Beef cattle										
Members.....	No	296	177	99	37	2.2	34.5	11.87 ± .11		
Nonmembers.....	...	287	173	99	31	...	27.7	11.43 ± .10	+ .44 ± .15	3.0
Members.....	Yes	106	182	98	38	3.1	37.7	13.20 ± .15		
Nonmembers.....	...	287	173	99	31	...	27.7	11.43 ± .10	+1.77 ± .18	9.6
Members.....	Yes	106	182	98	38	3.1	37.7	13.20 ± .15		
Nonmembers.....	No	296	177	99	37	2.2	34.5	11.87 ± .11	+1.33 ± .18	7.2
Swine										
Members.....	No	226	175	101	34	2.1	35.0	12.14 ± .19		
Nonmembers.....	...	283	174	100	31	...	28.0	11.71 ± .10	+ .43 ± .22	2.0
Members.....	Yes	175	183	96	33	3.0	36.1	12.62 ± .15		
Nonmembers.....	...	283	174	100	31	...	28.0	11.71 ± .10	+ .91 ± .18	5.1
Members.....	Yes	175	183	96	33	3.0	36.1	12.62 ± .15		
Nonmembers.....	No	226	175	101	34	2.1	35.0	12.14 ± .19	+ .48 ± .24	2.0
Crops general										
Members.....	No	376	178	99	33	2.4	35.5	13.11 ± .10		
Nonmembers.....	...	284	173	99	31	...	27.9	12.22 ± .13	+ .89 ± .16	5.4
Legumes										
Members.....	No	359	178	100	33	2.4	36.4	10.28 ± .10		
Nonmembers.....	...	269	174	100	31	...	28.7	9.06 ± .11	+1.22 ± .15	8.1

(Table is concluded on next page.)

TABLE 15—*Concluded*

Group	4-H project in division	Number in group	Age (months)	I.Q.	Attitude II	Years in 4-H club	Total achievement	Achievement score, on division	Difference	D/P.E.
Long-row garden										
Members.....	No	328	179	100	33	2.4	37.0	13.83 ± .10		
Nonmembers.....	...	270	174	100	31	...	28.7	13.44 ± .12	+ .39 ± .15	2.5
Members.....	Yes	6	185	103	30	2.5	35.8	13.83 ± .99		
Nonmembers.....	...	270	174	100	31	...	28.7	13.44 ± .12	+ .39 ± 1.00	.4
Members.....	Yes	6	185	103	30	2.5	35.8	13.83 ± .99		
Members.....	No	328	179	100	33	2.4	28.7	13.83 ± .10	.00	
Corn										
Members.....	No	257	177	100	33	2.3	35.6	13.56 ± .13		
Nonmembers.....	...	257	174	100	31	...	29.3	12.84 ± .13	+ .72 ± .18	3.9
Members.....	Yes	66	185	102	34	3.1	43.9	14.68 ± .29		
Nonmembers.....	...	257	174	100	31	...	29.3	12.84 ± .13	+1.84 ± .31	5.9
Members.....	Yes	66	185	102	34	3.1	43.9	14.68 ± .29		
Members.....	No	257	177	100	33	2.3	35.6	13.56 ± .13	+1.12 ± .32	3.6
Potatoes										
Members.....	No	326	179	100	34	2.4	37.3	10.49 ± .11		
Nonmembers.....	...	245	175	100	31	...	29.5	10.11 ± .12	+ .38 ± .17	2.3
Members.....	Yes	3	173	101	38	2.7	44.7	10.67 ± .90		
Nonmembers.....	...	245	175	100	31	...	29.5	10.11 ± .12	+ .56 ± .90	.6
Members.....	Yes	3	173	101	38	2.7	44.7	10.67 ± .90		
Members.....	No	326	179	100	34	2.4	37.3	10.49 ± .11	+ .18 ± .90	.2

TABLE 16.—FARM BOYS WHO HAD HAD AGRICULTURE IN HIGH SCHOOL: DIFFERENCES IN AVERAGE ACHIEVEMENT SCORES MADE ON VARIOUS DIVISIONS OF THE ACHIEVEMENT TEST

Group	4-H project in division	Number in group	Age (months)	I.Q.	Attitude II	Years in 4-H club	Total achievement	Achievement score, on division	Difference	D/P.E.
General livestock										
Members ^a	No	112	201	99	40	3.2	55.0	15.40 ± .19		
Nonmembers.....	...	14	174	94	33	...	48.1	13.71 ± .79	+1.69 ± .81	2.1
Poultry										
Members.....	No	96	200	99	39	3.1	54.8	15.69 ± .12		
Nonmembers.....	...	14	174	94	33	...	48.1	14.86 ± .83	+ .83 ± .84	1.0
Members.....	Yes	16	205	100	41	3.9	55.9	15.94 ± .39		
Nonmembers.....	...	14	174	94	33	...	48.1	14.86 ± .83	+1.08 ± .92	1.2
Members.....	Yes	16	205	100	41	3.9	55.9	15.94 ± .39		
Members.....	No	14	174	94	33	...	48.1	14.86 ± .83	+ .25 ± .41	.6
Sheep										
Members.....	No	108	201	99	40	3.3	54.9	14.06 ± .14		
Nonmembers.....	...	13	187	101	36	...	51.8	14.31 ± .43	- .25 ± .45	.6
Members.....	Yes	4	204	94	38	2.2	57.3	15.50 ± .85		
Nonmembers.....	...	13	187	101	36	...	51.8	14.31 ± .43	+1.19 ± .95	1.2
Members.....	Yes	4	204	94	38	2.2	57.3	15.50 ± .85		
Members.....	No	108	201	99	40	3.3	54.9	14.06 ± .14	+1.44 ± .86	1.7
Dairy cattle										
Members.....	No	82	198	98	40	3.0	53.1	11.11 ± .33		
Nonmembers.....	...	13	187	101	36	...	51.8	12.46 ± .41	-1.35 ± .53	2.6
Members.....	Yes	30	210	100	40	3.9	60.0	12.33 ± .37		
Nonmembers.....	...	13	187	101	36	...	51.8	12.46 ± .41	- .13 ± .55	.2
Members.....	Yes	30	210	100	40	3.9	60.0	12.33 ± .37		
Members.....	No	82	198	98	40	3.0	53.1	11.11 ± .33	+1.22 ± .50	2.4

^aIn this table the term members includes past members also.

(Table is continued on next page.)

TABLE 16—Continued

Group	4-H project in division	Number in group	Age (months)	I.Q.	Attitude II	Years in 4-H club	Total achievement	Achievement score, on division	Difference	D/P.E.
Beef cattle										
Members.....	No	80	200	99	39	3.0	55.4	13.56 ± .17		
Nonmembers.....	...	13	187	101	36	...	51.8	12.62 ± .34	+ .94 ± .38	2.4
Members.....	Yes	32	203	99	40	3.8	54.0	13.34 ± .23		
Nonmembers.....	...	13	187	101	36	...	51.8	12.62 ± .34	+ .72 ± .41	1.7
Members.....	Yes	32	203	99	40	3.8	54.0	13.34 ± .23		
Members.....	No	80	200	99	39	3.0	55.4	13.56 ± .17	- .22 ± .29	.8
Swine										
Members.....	No	63	200	99	37	3.0	54.9	15.37 ± .22		
Nonmembers.....	...	13	187	101	36	...	51.8	14.62 ± .60	+ .75 ± .63	1.2
Members.....	Yes	49	202	99	37	3.5	55.1	15.86 ± .26		
Nonmembers.....	...	13	187	101	36	...	51.8	14.62 ± .60	+1.24 ± .65	1.9
Members.....	Yes	49	202	99	37	3.5	55.1	15.86 ± .26		
Members.....	No	63	200	99	37	3.0	54.9	15.37 ± .22	+ .49 ± .34	1.4
Crops general										
Members.....	No	130	200	98	36	3.2	53.3	14.22 ± .15		
Nonmembers.....	...	14	192	104	34	...	48.9	14.21 ± .48	+ .01 ± .51	.02
Legumes										
Members.....	No	128	202	99	36	3.2	53.8	11.98 ± .15		
Nonmembers.....	...	14	192	104	34	...	48.9	12.00 ± .43	- .02 ± .45	.04

(Table is concluded on next page.)

TABLE 16—*Concluded*

Group	4-H project in division	Number in group	Age (months)	I.Q.	Attitude II	Years in 4-H club	Total achievement	Achievement score, on division	Difference	D/P.E.
Long-row garden										
Members.....	No	124	200	98	36	3.2	53.3	14.89 ± .16		
Nonmembers.....	...	13	191	105	35	...	49.4	14.38 ± .40	+ .51 ± .43	1.2
Members.....	Yes	1	186	107	38	2.0	52.0	18.00		
Nonmembers.....	...	13	191	105	35	...	49.4	14.38 ± .40	+3.62	...
Members.....	Yes	1	186	107	38	2.0	52.0	18.00		
Members.....	No	124	200	98	36	3.2	53.3	14.89 ± .16	+3.11	...
Corn										
Members.....	No	70	201	99	37	3.1	54.2	15.97 ± .20		
Nonmembers.....	...	13	191	105	35	...	49.4	15.31 ± .82	+ .66 ± .84	.8
Members.....	Yes	54	198	98	35	3.4	52.4	15.76 ± .24		
Nonmembers.....	...	13	191	105	35	...	49.4	15.31 ± .82	+ .45 ± .85	.5
Members.....	Yes	54	198	98	35	3.4	52.4	15.76 ± .24		
Members.....	No	70	201	99	37	3.1	54.2	15.97 ± .20	- .21 ± .31	.7
Potatoes										
Members.....	No	119	199	99	36	3.3	53.4	12.09 ± .17		
Nonmembers.....	...	13	191	105	35	...	49.4	11.77 ± .69	+ .32 ± .71	.4

This same conclusion may be reached by comparing the scores of members who had had a 4-H club project in the subject-matter covered by the division, with the scores of members who had not, when neither group had studied agriculture in high school. In six of the eight divisions where comparisons could be made, the differences were in favor of the members who had had a 4-H club project, and there was no difference in one division (long-row garden). Significant differences occurred in the sheep, beef, and corn divisions. The average unweighted difference for the eight divisions was .58 point in favor of the members who had had a 4-H club project in the subject matter covered by the division being scored. This is probably a real difference, altho it is just under the border line that is usually considered statistically significant, the odds being approximately 17 to 1 that the difference did not occur by chance.

The results were not nearly so strong in favor of 4-H club training when similar comparisons were made with the scores of the boys who *had studied agriculture in high school* (Table 16). While most of the comparisons favored the boys who had the most 4-H club training, none of the differences in the scores made on the separate divisions of the test proved to be significant. Taken together these differences probably do indicate a slight but real difference in favor of the boys who had taken 4-H club training. So few boys were included in some of the groups that even fair-sized differences could not be shown to be statistically significant.

It appears from these results that in general the 4-H clubs had improved the boys' capability, as measured by the achievement test, especially the boys who had not taken agriculture in high school. In some divisions of the work, however, practically no improvement was indicated, possibly because in 4-H club teaching the emphasis has often not been placed upon those phases of the work which would enable the members to answer the achievement questionnaire correctly. Thus a boy might learn to fit a pig for the show ring and not be able to mark correctly a statement such as "Milk as a protein supplement to corn has no equal for growing pigs."

Girls. According to a multiple correlation between the girls' achievement scores and the variables listed in Table 7, page 288, about half the variation in girls' achievement may be accounted for by differences in number of years of work in 4-H clubs, age, I.Q., ascendance-submission, and so forth. The multiple-correlation coefficients obtained were .695 for the girl members and .669 for the girl nonmembers. In the correlation of boy's achievement scores with other variables, the amount of variation which could be accounted for was

materially increased by taking into account the question of agricultural training in high school, and consequently the data for the girls were subjected to a similar analysis involving the question of training in home economics in high school.

Difference in Total Scores.—Girl members (including past members) had in general somewhat higher total achievement scores¹ than nonmember girls. The average total achievement scores and other relevant data for the two groups were as follows:

	Num- ber	Age (months)	I.Q.	Organi- zation index	Total achieve- ment score	Differ- ence	D/P.E.
Members.....	721	170	104	9.5	34.67 ± .35		
Nonmembers...	379	173	102	8.7	32.02 ± .48	+2.65 ± .60	4.4

The difference of $2.65 \pm .60$ in the total achievement scores of the two groups is statistically significant. Accordingly the 4-H club work apparently did increase the capability of the girls, tho not so markedly as that of the boys (page 294). Tho not all the girls included in the present study were involved in the above comparison (cf. page 277), the omissions occurred entirely by chance so far as achievement is concerned, and consequently the sample is no doubt representative of the entire group.

Differences in Subject-Matter Scores.—The three main subject-matter divisions of the girls' achievement test were clothing, foods, and room improvement. The 36 exercises on clothing were divided into groups of 9 each: the first 9 designed for girls who had had only one year of 4-H club clothing work; the second 9 for those who had had two years of such work; the third 9, three years; and the fourth 9, four years. Exercises on foods and room improvement were similarly arranged, except that the test for room improvement covered only two years of training and consisted of but 18 exercises. The average achievement scores² made by the members³ and the nonmembers on the three main divisions of the test were studied separately.

Considering the total clothing scores (scores on the first 36 exercises) of girls who *had not studied sewing or home economics in school*, the members made higher scores on the average than the nonmembers (Table 17). The difference is statistically significant in all cases where the members had taken two or more years of 4-H club

¹Total achievement equals the number of right answers on the achievement test minus half the number of wrong answers.

²These scores equal the number of exercises marked correctly minus half the number marked incorrectly.

³Members and past members are grouped together for this part of the study.

TABLE 17.—GIRLS WHO HAD NOT HAD SEWING OR GENERAL HOME ECONOMICS IN SCHOOL: TOTAL ACHIEVEMENT SCORES AND SCORES ON CLOTHING SECTION OF ACHIEVEMENT TEST^a

Group	Years of 4-H clothing	Number in group	Age (months)	I.Q.	Organiza- tion index	Years in 4-H club	Achievement		Difference	D/P.E.
							Total ^b	First 36 exercises		
Members ^c vs. nonmembers										
Members.....	0	38	160	101	8.4	1.5	28.4	15.58 ± .62	+.53 ± .66	.8
Nonmembers.....	..	297	169	101	7.4	...	28.9	15.05 ± .23	+1.46 ± .68	2.2
Nonmembers ^d.....	..	220	160	103	6.4	...	....	14.12 ± .27		
Members.....	1	241	158	102	7.3	1.2	27.9	15.19 ± .27	+.14 ± .36	.4
Nonmembers.....	..	297	169	101	7.4	...	28.9	15.05 ± .23	+1.07 ± .38	2.8
Nonmembers ^d.....	..	220	160	103	6.4	...	....	14.12 ± .27		
Members.....	2	150	167	106	9.3	2.3	34.0	18.23 ± .27	+.3.18 ± .35	9.1
Nonmembers.....	..	297	169	101	7.4	...	28.9	15.05 ± .23		
Members.....	3	75	180	104	11.4	3.4	40.8	20.89 ± .42	+5.84 ± .48	12.2
Nonmembers.....	..	297	169	101	7.4	...	28.9	15.05 ± .23	+4.56 ± .48	9.4
Nonmembers ^d.....	..	210	180	99	8.3	...	....	16.33 ± .25		
Members.....	4	38	186	103	12.5	4.4	43.2	21.66 ± .48	+6.61 ± .53	12.5
Nonmembers.....	..	297	169	101	7.4	...	28.9	15.05 ± .23	+4.46 ± .55	8.2
Nonmembers ^d.....	..	147	186	98	9.1	...	....	17.20 ± .26		
Members with 4-H clothing training vs. members without that training										
Members.....	1	241	158	102	7.3	1.2	27.9	15.19 ± .27	-.39 ± .67	.6
Members.....	0	38	160	101	8.4	1.5	28.4	15.58 ± .62		
Members.....	2	150	167	106	9.3	2.3	34.0	18.23 ± .27	+2.65 ± .67	4.0
Members.....	0	38	160	101	8.4	1.5	28.4	15.58 ± .62	+1.03 ± .69	1.5
Members ^e	0	25	168	102	10.3	...	....	17.20 ± .64		
Members.....	3	75	180	104	11.4	3.4	40.8	20.89 ± .42	+5.31 ± .75	7.1
Members.....	0	38	160	101	8.4	1.5	28.4	15.58 ± .62	+2.61 ± 1.02	2.5
Members ^e	0	18	180	98	10.5	...	....	18.28 ± .93		
Members.....	4	38	186	103	12.5	4.4	43.2	21.66 ± .48	+6.08 ± .78	7.8
Members.....	0	38	160	101	8.4	1.5	28.4	15.58 ± .62	+2.51 ± 1.10	2.3
Members ^e	0	13	185	99	12.2	...	....	19.15 ± .99		

(Table is concluded on next page.)

TABLE 17—*Concluded*

Group	Years of 4-H clothing	Number in group	Age (months)	I.Q.	Organiza- tion index	Years in 4-H club	Achievement		Difference	D/P.E.
							Total ^b	First 36 exercises		
Members with more than one year 4-H clothing training vs. members with one year of that training										
Members.....	2	150	167	106	9.3	2.3	34.0	18.23 ± .27		
Members.....	1	241	158	102	7.3	1.2	27.9	15.19 ± .27	+3.04 ± .38	8.0
Members ¹	1	182	167	103	7.9	...	....	16.42 ± .29	+1.81 ± .39	4.6
Members.....	3	75	180	104	11.4	3.4	40.8	20.89 ± .42		
Members.....	1	241	158	102	7.3	1.2	27.9	15.19 ± .27	+5.70 ± .50	11.4
Members ¹	1	108	180	100	8.7	...	....	17.73 ± .35	+3.16 ± .55	5.8
Members.....	4	38	186	103	12.5	4.4	43.2	21.66 ± .48		
Members.....	1	241	158	102	7.3	1.2	27.9	15.19 ± .27	+6.47 ± .55	11.7
Members ¹	1	79	186	100	9.1	...	....	18.41 ± .39	+3.25 ± .62	5.3

^aThe first 36 exercises of the achievement test cover subject matter offered in four years of 4-H clothing work (see footnote 2, page 285). ^bTotal achievement equals the number of right answers minus one-half the number of wrong answers (see footnote 2, page 285). ^cIn this table the term members includes past members also. ^dSample of nonmembers comparable to members with respect to age. ^eSample of members with no 4-H clothing training who were comparable in age to members who had such training. ^fSample of members with one year of 4-H clothing training who were comparable in age to members who had more than one year of such training.

work with clothing. Also, the difference between the scores of members and nonmembers increased very consistently as the amount of 4-H club training increased beyond the first year of training. Furthermore members with the greater amount of training made higher scores on the clothing test than those with less training, tho the differences between the scores of members who had taken one year of 4-H club training in clothing and of members who had received no such training are not statistically significant. Not too much importance should be attached to this lack of statistical significance, however, for the number of members who had taken no 4-H club work in clothing were perhaps too few to be entirely representative. Probably, also, some of the girls who had done no work of this sort in 4-H clubs had received training from some other source.

Among the girls who had taken work in sewing or in general home economics in school, much less difference occurred between the total clothing scores of the members and of the nonmembers (Table 18). Nonmembers made higher scores, on the average, than members who had taken less than three years of training in 4-H club work in clothing, and about the same as those who had had three years or more. These higher scores of the nonmembers were probably due in large part to the fact that the nonmembers were the older.

Training in foods or cooking in 4-H clubs apparently affected the achievement scores more directly than the training in clothing work. Among the girls who had not studied cooking or general home economics in school, the members made higher scores on the foods test than the nonmembers in each of the comparisons, and the differences increased roughly in proportion to the amount of 4-H club training in foods that the members had received (Table 19). In these comparisons the groups, except those in the fourth comparison, were quite comparable with respect to age and I.Q., so that these are probably real differences. Moreover, the members who had had one year of 4-H club work in foods made better scores than members without such training; and while the groups were not quite comparable with respect to age, I.Q., and number of years in 4-H club work (Table 20), this difference is also probably a significant one.

Among girls who *had studied cooking or general home economics in school*, on the other hand, the scores made by the members and the nonmembers on the foods test were about the same, tho so few of these girls had had more than one year of 4-H club training in foods that the results can be considered only suggestive.

With regard to room improvement, the members in each comparison made higher scores than the nonmembers (Table 21). Mem-

TABLE 18.—GIRLS WHO HAD SEWING OR GENERAL HOME ECONOMICS IN SCHOOL: TOTAL ACHIEVEMENT SCORES AND SCORES ON CLOTHING SECTION OF ACHIEVEMENT TEST^a

Group	Years of 4-H clothing	Number in group	Age (months)	I.Q.	Attitude I	Organiza- tion index	Years in 4-H club	Achievement		Difference	D/P.E.
								Total ^b	First 36 exercises		
Members ^a vs. nonmembers											
Members.....	0	16	174	105	4.3	10.8	1.8	35.9	16.25 ± .85	-4.92 ± .94	5.2
Nonmembers.....	...	82	189	105	4.3	13.1	...	43.0	21.17 ± .38		
Members.....	1	64	182	103	4.5	9.5	1.3	38.7	19.88 ± .42	-1.29 ± .57	2.3
Nonmembers.....	...	82	189	105	4.3	13.1	...	43.0	21.17 ± .38		
Members.....	2	48	182	105	4.3	12.9	2.3	40.8	19.94 ± .45	-1.23 ± .59	2.1
Nonmembers.....	...	82	189	105	4.3	13.1	...	43.0	21.17 ± .38		
Members.....	3	36	189	102	4.3	11.1	3.4	42.8	21.17 ± .63	.00 ± .74	...
Nonmembers.....	...	82	189	105	4.3	13.1	...	43.0	21.17 ± .38		
Members.....	4	18	184	95	3.6	13.8	4.4	45.8	22.06 ± 1.11	+ .89 ± 1.17	.8
Nonmembers.....	...	82	189	105	4.3	13.1	...	43.0	21.17 ± .38		
Members with 4-H clothing training vs. members without that training											
Members.....	1	64	182	103	4.5	9.5	1.3	38.7	19.88 ± .42	+3.63 ± .95	3.8
Nonmembers.....	0	16	174	105	4.3	10.8	1.8	35.9	16.25 ± .85		
Members.....	2	48	182	105	4.3	12.9	2.3	40.8	19.94 ± .45	+3.69 ± .96	3.8
Nonmembers.....	0	16	174	105	4.3	10.8	1.8	35.9	16.25 ± .85		
Members.....	3	36	189	102	4.3	11.1	3.4	42.8	21.17 ± .63	+4.92 ± 1.06	4.6
Nonmembers.....	0	16	174	105	4.3	10.8	1.8	35.9	16.25 ± .85		
Members.....	4	18	184	95	3.6	13.8	4.4	45.8	22.06 ± 1.11	+5.81 ± 1.40	4.2
Nonmembers.....	0	16	174	105	4.3	10.8	1.8	35.9	16.25 ± .85		
Members with more than one year 4-H clothing training vs. members with one year of that training											
Members.....	2	48	182	105	4.3	12.9	2.3	40.8	19.94 ± .45	+ .06 ± .62	0.1
Nonmembers.....	1	64	182	103	4.5	9.5	1.3	38.7	19.88 ± .42		
Members.....	3	36	189	102	4.3	11.1	3.4	42.8	21.17 ± .63	+1.29 ± .76	1.7
Nonmembers.....	1	64	182	103	4.5	9.5	1.3	38.7	19.88 ± .42		
Members.....	4	18	184	95	3.6	13.8	4.4	45.8	22.06 ± 1.11	+2.18 ± 1.19	1.8
Nonmembers.....	1	64	182	103	4.5	9.5	1.3	38.7	19.88 ± .42		

^aThe first 36 exercises of the achievement test cover subject matter offered in four years of 4-H clothing work (see footnote 2, page 285). ^bTotal achievement equals the number of right answers minus half the number of wrong answers on all of the exercises (see footnote 2, page 285). ^cIn this table the term members includes past members also.

TABLE 19.—GIRLS WHO HAD NOT HAD COOKING OR GENERAL HOME ECONOMICS IN SCHOOL: TOTAL ACHIEVEMENT SCORES AND SCORES ON FOODS SECTION OF ACHIEVEMENT TEST^a

Group	Years of 4-H foods	Number in group	Age (months)	I.Q.	Attitude I	Organization index	Years in 4-H club	Achievement		Difference	D/P.E.
								Total ^b	Second 36 exercises		

Members ^c vs. nonmembers											
Members.....	0	482	166	104	4.3	8.9	1.9	32.5	10.46 ± .16		
Nonmembers.....	...	298	169	101	4.6	7.5	...	28.9	9.70 ± .21	+ .76 ± .26	2.9
Members.....	1	44	170	107	3.8	11.4	3.1	36.4	12.45 ± .56		
Nonmembers.....	...	298	169	101	4.6	7.5	...	28.9	9.70 ± .21	+2.75 ± .59	4.7
Members.....	2	12	168	103	3.9	8.5	3.1	35.9	13.33 ± 1.21		
Nonmembers.....	...	298	169	101	4.6	7.5	...	28.9	9.70 ± .21	+3.63 ± 1.22	3.0
Members.....	3	2	183	102	3.8	6.5	5.5	43.0	18.00		
Nonmembers.....	...	298	169	101	4.6	7.5	...	28.9	9.70 ± .21	+8.30	...

Members with 4-H foods training vs. members without that training											
Members.....	1	44	170	107	3.8	11.4	3.1	36.4	12.45 ± .56		
Members.....	0	482	166	104	4.3	8.9	1.9	32.5	10.46 ± .16	+1.99 ± .58	3.4
Members.....	2	12	168	103	3.9	8.5	3.1	35.9	13.33 ± 1.21		
Members.....	0	482	166	104	4.3	8.9	1.9	32.5	10.46 ± .16	+2.87 ± 1.22	2.4
Members.....	3	2	183	102	3.8	6.5	5.5	43.0	18.00		
Members.....	0	482	166	104	4.3	8.9	1.9	32.5	10.46 ± .16	+7.54	...

Members with more than one year 4-H foods training vs. members with one year of that training											
Members.....	2	12	168	103	3.9	8.5	3.1	35.9	13.33 ± 1.21		
Members.....	1	44	170	107	3.8	11.4	3.1	36.4	12.45 ± .56	+ .88 ± 1.33	.7
Members.....	3	2	183	102	3.8	6.5	5.5	43.0	18.00		
Members.....	1	44	170	107	3.8	11.4	3.1	36.4	12.45 ± .56	+5.55	...

^aThe second 36 exercises of the girls' achievement test cover subject matter offered in four years of 4-H food work (see footnote 2, page 285). ^bTotal achievement equals the number of right answers minus half the number of wrong answers (see footnote 2, page 285). ^cIn this table the term members includes past members also.

TABLE 20.—GIRLS WHO HAD HAD COOKING OR GENERAL HOME ECONOMICS IN SCHOOL: TOTAL ACHIEVEMENT SCORES AND SCORES ON FOODS SECTION OF ACHIEVEMENT TEST^a

Group	Years of 4-H foods	Number in group	Age (months)	I.Q.	Attitude I	Organiza- tion index	Years in 4-H club	Achievement		Difference	D/P.E.
								Total ^b	Second 36 exercises		
Members ^a vs. nonmembers											
Members.....	0	• 149	185	104	4.3	11.2	2.3	41.6	14.79 ± .33	- .59 ± .54	1.1
Nonmembers.....	...	80	188	106	4.4	13.0	...	43.9	15.38 ± .42		
Members.....	1	15	192	100	4.3	11.0	3.1	41.2	13.67 ± 1.05	-1.71 ± 1.14	1.5
Nonmembers.....	...	80	188	106	4.4	13.0	...	43.9	15.38 ± .42		
Members.....	2	1	182	107	2.8	11.0	4.0	44.0	27.00	+11.62	...
Nonmembers.....	...	80	188	106	4.4	13.0	...	43.9	15.38 ± .42		
Members.....	3	3	186	103	2.6	11.7	5.0	47.3	18.67	+3.29	...
Nonmembers.....	...	80	188	106	4.4	13.0	...	43.9	15.38 ± .42		
Members.....	4	1	152	120	4.2	17.0	3.0	40.0	18.00	+2.62	...
Nonmembers.....	...	80	188	106	4.4	13.0	...	43.9	15.38 ± .42		
Members with 4-H foods training vs. members without that training											
Members.....	1	15	192	100	4.3	11.0	3.1	41.2	13.67 ± 1.05	-1.12 ± 1.10	1.0
Members.....	0	149	185	104	4.3	11.2	2.3	41.6	14.79 ± .33		
Members.....	2	1	182	107	2.8	11.0	4.0	44.0	27.00	+12.21	...
Members.....	0	149	185	104	4.3	11.2	2.3	41.6	14.79 ± .33		
Members.....	3	3	186	103	2.6	11.7	5.0	47.3	18.67	+3.88	...
Members.....	0	149	185	104	4.3	11.2	2.3	41.6	14.79 ± .33		
Members.....	4	1	152	120	4.2	17.0	3.0	40.0	18.00	+3.21	...
Members.....	0	149	185	104	4.3	11.2	2.3	41.6	14.79 ± .33		

^aThe second 36 exercises of the girls' achievement test cover subject matter offered in four years of 4-H food work (see footnote 2, page 285). ^bTotal achievement equals the number of right answers minus half the number of wrong answers (see footnote 2, page 285). ^cIn this table the term members includes past members also.

TABLE 21.—GIRL MEMBERS AND NONMEMBERS: TOTAL ACHIEVEMENT SCORES AND SCORES ON ROOM-IMPROVEMENT SECTION OF ACHIEVEMENT TEST^a

Group	Years of 4-H room improvement	Number in group	Age (months)	I.Q.	Organization index	Years in 4-H club	Achievement		Difference	D/P.E.
							Total ^b	Last 18 exercises		
Members ^c vs. nonmembers										
Members.....	0	504	174	105	9.7	1.9	38.3	6.49 ± .12	+ .61 ± .19	3.2
Nonmembers.....	..	289	176	104	9.2	...	35.3	5.88 ± .16		
Members.....	1	19	193	104	15.5	3.4	47.1	10.68 ± .53	+4.80 ± .55	8.7
Nonmembers.....	..	289	176	104	9.2	...	35.3	5.88 ± .16		
Nonmembers ^d.....	..	149	193	100	11.8	...	....	7.14 ± .21	+3.54 ± .57	6.2
Members.....	2	5	200	108	15.2	5.0	52.0	10.80 ± .91		
Nonmembers.....	..	289	176	104	9.2	...	35.3	5.88 ± .16	+4.92 ± .93	5.3
Nonmembers ^d	90	200	101	13.4	8.06 ± .27			+2.74 ± .95	2.9
Members with 4-H room-improvement training vs. members without that training										
Members.....	1	19	193	104	15.5	3.4	47.1	10.68 ± .53	+4.19 ± .54	7.8
Members.....	0 ^e	504	174	105	9.7	1.9	38.3	6.49 ± .12			+3.03 ± .56	5.4
Members ^a	0	232	193	102	12.5	...	....	7.65 ± .18		
Members.....	2	5	200	108	15.2	5.0	52.0	10.80 ± .91	+4.31 ± .92	4.7
Members.....	0	504	174	105	9.7	1.9	38.3	6.49 ± .12			+2.60 ± .94	2.8
Members ^a	0	147	200	102	13.6	...	....	8.20 ± .23		

^aThe last 18 exercises of the girls' achievement test cover subject matter offered in two years of 4-H room-improvement work (see footnote 2, page 285). ^bTotal achievement equals the number of right answers minus half the number of wrong answers (see footnote 2, page 285). ^cIn this table the term members includes past members also. ^dSample of nonmembers comparable to members with respect to age. ^eSample of members with no 4-H training who were comparable in age to members who had such training.

bers who had taken 4-H club training in room improvement also made higher scores than those members who had not. The scores of members, both those without special training in room improvement and those with such training, were significantly higher than the scores of nonmembers of comparable ages. Also, the scores of members who had had two years of 4-H club training in room improvement were 2.7 and 2.6 points higher, respectively, than those of nonmembers and of members who had had no special training, tho so few of the members had taken two years of such training that the differences were not statistically significant.

Very little training in room improvement is offered in grade or high schools; and consequently the data on this section of the test were not classified on the basis of school training as were the data on clothing and foods.

Apparently, then, according to the foregoing data, 4-H club work does increase the capability of the girls, and, as would be expected, it is most effective in this respect when the work is continued for more than one year. This is especially true of clothing work, tho it holds true also for the other types of subject-matter dealt with.

Prize Winning in 4-H Club Work

The winning of prizes and awards in a given field may be considered an indication of capability in that field. In order to use in this study such winnings as a measure of the capability of 4-H club members in the general field represented by 4-H club work, a prize-index score card was devised.¹ The prize index for each member was the sum of the scores made on (1) 4-H club exhibits, (2) membership on a judging team, (3) membership on a demonstration team, (4) championship of a project team, and (5) achievement awards. Since data on prizes and awards won in 4-H club work only were obtained, no prize index could be worked out for nonmembers, and therefore the effect of 4-H club membership on the prize index could not be measured.

Boys. The differences between the percentages of boy members and past members having high prize indexes and those having low prize indexes indicates that a significantly higher percentage of members than of past members had won prizes (Fig. 3). This relationship was probably due to the fact that the members had been in 4-H club work longer and consequently had had more opportunities of winning prizes or awards. When data on farm-boy members and past members were classified according to whether or not a prize had been

¹This score card was constructed by E. I. Pilchard, Mary A. McKee, D. E. Lindstrom, and E. L. Welker.

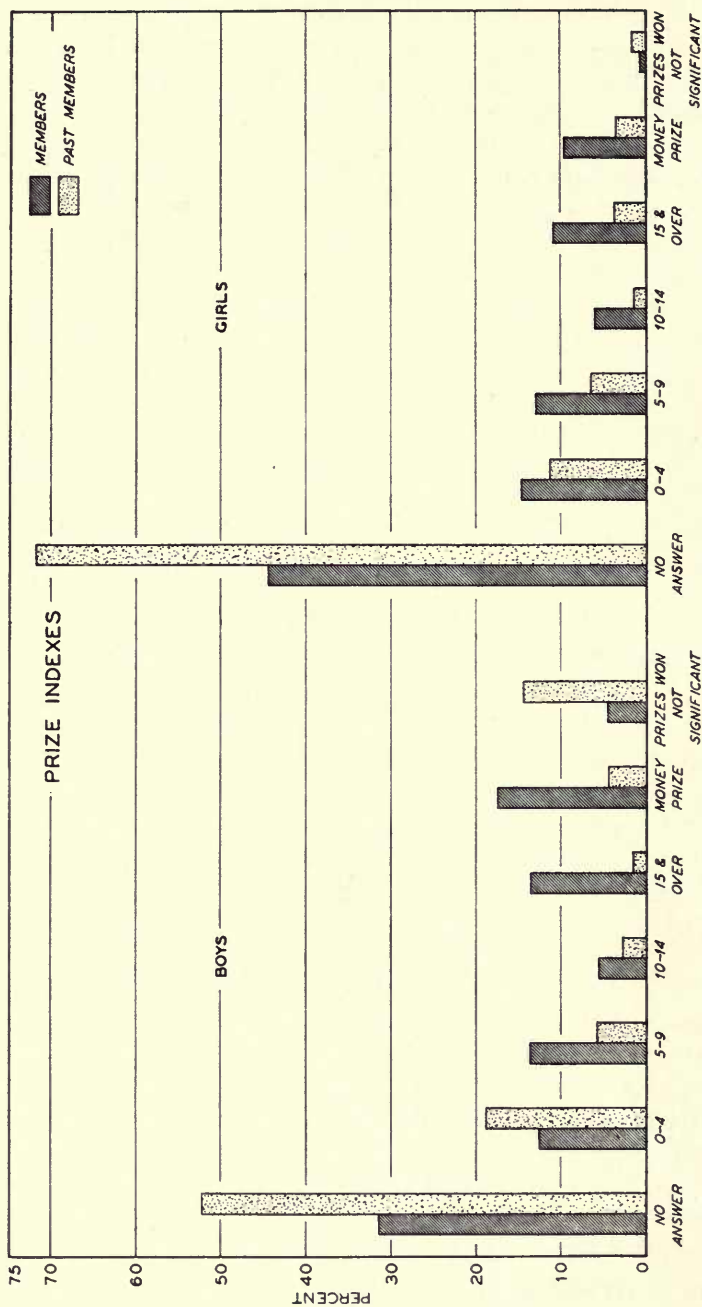


FIG. 3.—DISTRIBUTION OF INDEXES OF PRIZES WON AND AWARDS RECEIVED BY BOYS AND BY GIRLS

won (Table 4, page 283), the tetrachoric correlation between prize winning and number of years in 4-H club work was $+.420$, indicating that the longer a boy remains in a 4-H club the more likely he is to win a prize. There was little relationship, however, between prize winning and achievement, the correlation being only $+.192$.

According to the multiple-factor analysis described on page 290, prize winning is positively associated to a slight extent with adaptability to farm life and is negatively associated with or opposed to general intelligence (Table 11, page 293). By the same analysis, number of years of membership was shown to be positively associated with adaptability to farm life and with prize winning, and negatively associated to a slight extent with general intelligence.

Girls. Tho the data on prize winning by the girls were not fully analyzed, the analysis indicated that a higher percentage of members than of past members had won prizes and awards (Fig. 3) and that prize winning was associated only to a slight degree with scores made on achievement tests and with general capability.

Because a large number of both members and past members had won neither a prize nor an award of any kind, and furthermore because it was difficult to assign accurate values to the prizes and awards that were won, the data for that part of the study dealing with prizes and awards was divided into two classes only—according to whether or not a prize or award had been won. Scored in this way, prize index had a slight association with achievement (tetrachoric correlation of $+.278$) and but little association with the other variables studied (Table 8, page 289). Highest correlation ($+.316$) was with number of years of membership in a 4-H club.

According to the multiple-factor analysis (Table 12, page 293) prize winning on the part of the girls had a small degree of association with Factor I, a factor indicating achievement or general adaptability to farm life.

Perhaps, therefore, the setting up of prizes and awards has been overemphasized in 4-H club work, for the above analysis indicates little if any relationship between achievement (that is, mastery of the subject-matter of a project as indicated by the information test) and prize winning. Indeed the analysis indicates that the association is between prize winning and number of years in club work. Thus from the standpoint of effect of club work on capability, as measured by achievement, greater emphasis on other motivating forces, such as the opportunity to get a good start for farming, may perhaps be desirable.

Appreciation or Depreciation of Farm Life

Attitude of the boys and girls toward farm life was another important factor measured. While this attitude is not a direct measure of capability as defined on page 279, it seemed logical to suppose that it might be closely related to measures of this objective and therefore at least an indirect measure of it.¹ If attitude scores were found to be related to achievement scores, for example, then attitude might be considered to be an indirect measure of achievement.

Boys. The simple correlation coefficients between appreciation or depreciation of farm life (Attitude I), and number of years in 4-H club work, achievement, size of family, age, I.Q., ascendance-submission, organization index (not including 4-H club), parental organization index, socio-economic status, and social-behavior index were all very low for both member and nonmember boys (Table 3, page 282). For members the correlation of this attitude with number of years in a 4-H club was $+ .198$, and with achievement, $+ .175$. Both of these are, of course, too low to have any practical significance. Multiple-correlation coefficients obtained by using Attitude I as the dependent variable and the above-mentioned variables as the independent variables, were also low, being $+ .267$ and $+ .306$ respectively for members and nonmembers. Moreover, as was true also in the study of achievement (page 284), these multiple-correlation coefficients are not entirely satisfactory indexes of the relationships between Attitude I and other factors, because of the intercorrelation of the factors treated in the analysis as independent variables. For example, age was correlated with achievement to the extent of $+ .597$ and with organization index to the extent of $+ .467$, while the correlation between achievement and organization index was $+ .436$ (Table 4, page 283). Further attempts at analysis by joint correlation and by multiple-factor analysis also showed very little, if any, relationship between appreciation or depreciation of farm life and the other variables used in the study. Attitude I therefore cannot be considered even an indirect measure of achievement.

The fact that the members of 4-H clubs did have significantly greater appreciation of farm life than the nonmembers (Fig. 4) seemed to have no important bearing on the relationship between attitude and capability; for, as was pointed out in Bulletin 426 of this Station (the report of the first part of this study, dealing with

¹E. T. Hiller, Professor of Sociology at the University of Illinois, and consultant on some of the sociological phases of this study, stated: "The influence of attitude is of foremost importance in one's whole career. It should be correlated with mental tests, personality tests, and tests of ability."

selectivity factors affecting membership in 4-H clubs), this difference in attitude was due, for the most part, to selection rather than to 4-H club training. Furthermore, even if an increase in appreciation of farm life were to result from club work, this fact in itself would be no indication of improvement in capability of the members, as measured in this study, because there was no significant relationship between Attitude I and the measures of capability.

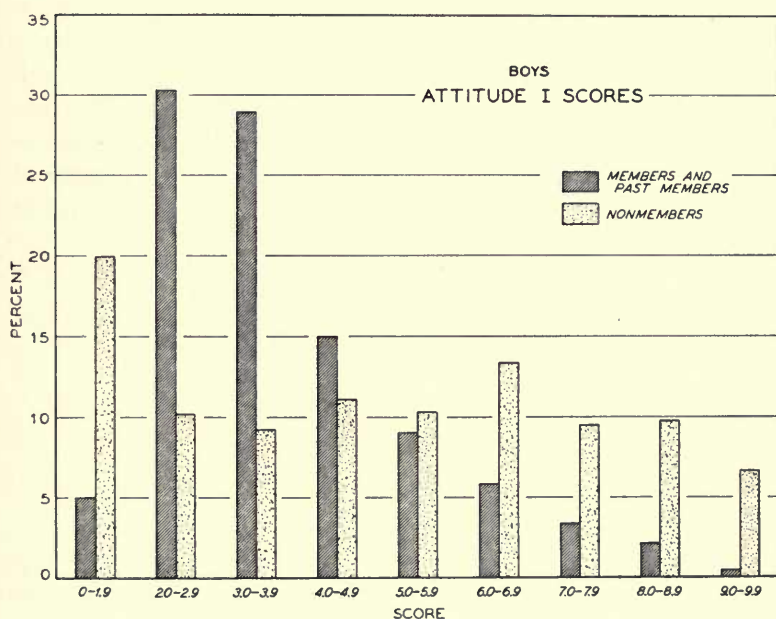


FIG. 4.—DISTRIBUTION OF SCORES MADE BY BOYS ON TEST FOR ATTITUDE I

The scores for Attitude I and the self-rating scores for attitude¹ measure to a considerable degree the same attitude, according to the tetrachoric correlation of $+ .631$ between them. Of the various statements from which scores for Attitude I were obtained,² statements 1,

¹The self-rating score for attitude was obtained by having each person mark on a graduated line the degree to which he was favorable or unfavorable to farming.

²The following statements were used in obtaining the Attitude I score:

(1) I enjoy farm life because the outdoor activities are conducive to good health. (2) I feel that the farm offers the best opportunity for self-expression. (3) I believe that farm life is for the uncultured and uncouth. (4) I think it is helpful to come into contact with people more often than one would in the

(Footnote concluded on following page.)

5, and 18 had the highest positive correlations with the self-rating score for attitude, while statements 4, 6, 7, 9, 11, 14, 20, 22, and 23 had high negative correlations with the self-rating score (Tables 22 and 23). The statements which had high positive correlations with the self-rating score also had positive weightings in the original Attitude I scale and likewise those having the high negative correlations with "expressed attitude" had negative weightings in the original scale. Moreover, attitude as measured by the original scale was highly correlated with Factor I (Table 23) of the factor analysis (simple correlation, $+ .912$). Statements 1, 5, 15, and 18 all had high positive association with Factor I, while statements 4, 6, 7, 9, 11, 14, 20, 22, and 23 all had high negative association with that factor. The self-rating score for attitude was highly associated with this same attitude factor (loading on Factor I, Table 23) and consequently represents an accurate index of what has been called Attitude I, "appreciation or depreciation of farm life."

Girls. The attitude of girls towards farm life was measured in the same manner and by the same list of statements (footnote 2, page 317) as for the boys, and was scored likewise according to the criterion "appreciation or depreciation of farm life."

Girl members of 4-H clubs made significantly better scores on Attitude I than nonmembers. The average score for members was 4.13 and for nonmembers 4.53. The difference was thus $+ .40$, which is 5.1 times its probable error ($+ .078$). The lower score indicates in

country. (5) I think the most desirable place there is to live is on the farm. (6) I find it unpleasant because social isolation is a part of farm life. (7) Farm life is too quiet for me. (8) I believe that the training and possibility of satisfactory development of young people obtained in the open country cannot be duplicated in any other way. (9) Though farm life may be good for one's health, I would not like it all the time. (10) I think that farm life is healthful, inspirational, and develops true values in respect to life. (11) I do not like the farm because of lack of educational facilities. (12) I like it because there is a pleasant atmosphere on the farm. (13) I would absolutely refuse to live in the country. (14) Farm life is all right about two months of the year. (15) I like farm life because there is always work to do on the farm. (16) For me the farm is a good place to go for a temporary rest. (17) I like it because there is more room to work and play on the farm. (18) I believe that the farm is a place which furnishes clean, wholesome living, regardless of periods of prosperity and depression. (19) I think that farm life can be improved upon in most communities. (20) I think farm life is desirable only when house and farm are equipped with modern conveniences and one can easily be connected with town and one's neighbors. (21) I think that farm life is good for those who are so financed that it is not an existence of drudgery. (22) I do not like farm life because the farmer is always the goat. (23) I do not like living on the farm because there are too many hardships connected with it. (24) I find the farm is a quiet place to live.

TABLE 22.—TETRACHORIC CORRELATION COEFFICIENTS BETWEEN INDIVIDUAL ATTITUDE STATEMENTS^a AND OTHER VARIABLES FOR 527 FARM-BOY MEMBERS AND PAST MEMBERS

Variable	E	K	C	D	A	T	L	1	2	4	5	6	7	8	9
Achievement.....	-.005	-.005	+.458	+.425	+.380	+.605	+.059	-.015	+.095	+.070	+.035	+.245	+.150	+.445	-.075
Self-rating attitude.....	+.458	+.001	+.325	+.050	+.290	+.325	+.090	+.310	+.301	+.570	+.635	+.785	+.950	+.375	-.560
Age.....	+.425	+.001	+.536	+.039	+.345	+.536	+.060	+.035	+.010	+.010	+.068	+.450	+.075	+.085	-.040
Intelligence quotient.....	+.380	+.050	+.039	+.020	+.020	+.110	+.234	+.101	+.010	+.205	+.101	+.025	+.032	+.165	+.130
Years in 4-H club work.....	+.605	+.290	+.345	+.020	+.390	+.390	+.144	+.030	+.165	+.075	+.135	+.150	+.250	+.150	+.185
Agricultural training in H.S.	+.325	+.325	+.536	+.110	+.390	+.210	+.210	+.030	+.110	+.200	+.005	+.010	+.140	+.260	+.165
Socio-economic status.....	+.090	+.090	+.060	+.234	+.144	+.210	+.050	+.050	+.140	+.265	+.185	+.060	+.001	+.010	-.095
Statement 1.....	+.015	+.310	+.035	+.101	+.030	+.030	+.050	+.001	+.001	+.205	+.260	+.250	+.475	+.038	-.385
" 2.....	+.095	+.301	+.010	+.101	+.165	+.110	+.140	+.205	+.150	+.150	+.335	+.065	+.150	+.070	+.035
" 4.....	+.070	+.570	+.010	+.205	+.075	+.200	+.265	+.265	+.335	+.090	+.090	+.240	+.395	+.130	+.440
" 5.....	+.035	+.635	+.068	+.101	+.135	+.005	+.185	+.250	+.065	+.335	+.340	+.335	+.418	+.300	+.550
" 6.....	+.450	+.785	+.075	+.025	+.250	+.010	+.060	+.475	+.150	+.325	+.240	+.418	+.275	+.130	+.290
" 7.....	+.150	+.950	+.075	+.032	+.250	+.140	+.091	+.038	+.070	+.150	+.395	+.300	+.275	+.275	+.460
" 8.....	+.445	+.375	+.085	+.165	+.185	+.260	+.095	+.388	+.035	+.440	+.290	+.550	+.460	+.130	+.130
" 9.....	+.075	+.560	+.040	+.130	+.185	+.168	+.095	+.375	+.340	+.050	+.160	+.308	+.360	+.175	+.410
" 10.....	+.170	+.475	+.035	+.055	+.165	+.325	+.110	+.375	+.185	+.463	+.160	+.470	+.525	+.065	+.430
" 11.....	+.050	+.465	+.033	+.048	+.075	+.010	+.045	+.250	+.150	+.050	+.165	+.080	+.200	+.105	+.105
" 12.....	+.037	+.101	+.180	+.045	+.090	+.010	+.095	+.380	+.160	+.375	+.425	+.525	+.650	+.335	+.380
" 14.....	+.165	+.650	+.047	+.093	+.260	+.105	+.095	+.135	+.155	+.195	+.212	+.455	+.475	+.050	+.490
" 15.....	+.080	+.156	+.070	+.257	+.050	+.115	+.130	+.210	+.038	+.140	+.239	+.040	+.385	+.250	+.290
" 16.....	+.298	+.541	+.150	+.030	+.325	+.325	+.085	+.215	+.025	+.000	+.001	+.045	+.215	+.002	+.105
" 17.....	+.194	+.023	+.250	+.042	+.125	+.235	+.040	+.210	+.075	+.050	+.000	+.478	+.330	+.325	+.220
" 18.....	+.455	+.120	+.290	+.140	+.207	+.295	+.120	+.075	+.050	+.135	+.040	+.050	+.310	+.050	+.140
" 19.....	+.355	+.506	+.190	+.155	+.095	+.195	+.180	+.200	+.035	+.135	+.070	+.345	+.165	+.065	+.420
" 20.....	+.093	+.580	+.135	+.118	+.050	+.070	+.065	+.105	+.100	+.325	+.300	+.468	+.285	+.110	+.315
" 21.....	+.150	+.431	+.165	+.370	+.060	+.275	+.065	+.115	+.240	+.325	+.122	+.568	+.475	+.115	+.325
" 22.....	+.025	+.621	+.133	+.093	+.071	+.200	+.190	+.398	+.050	+.195	+.530	+.040	+.360	+.570	+.335
" 23.....	+.050	+.850	+.040	+.133	+.701	+.225	+.190	+.421	+.310	+.240	+.170	+.175	+.075	+.067	-.080
" 24.....	-.115	-.075	-.010	-.050	-.050	-.075	+.133	+.202	+.005	+.014	+.170	+.175	+.075	+.067	-.080

(Table is concluded on next page.)

TABLE 22—*Concluded*

Variable	10	11	12	14	15	16	17	18	19	20	21	22	23	24
E Achievement.....	+170	+050	-.037	-.165	-.080	-.298	-.194	+.455	+.355	+.093	+.150	-.025	-.050	-.115
K Self-rating attitude.....	+475	-.465	+101	-.650	+156	-.541	-.023	+.415	+.506	+.580	+.431	-.621	-.850	-.075
A Age.....	+035	+033	+180	-.047	-.070	+.150	-.250	+.290	+.190	+.135	+.165	+.133	+.040	-.010
D Intelligence quotient.....	+055	+048	+045	-.093	-.257	+.030	-.042	+.140	+.155	+.118	+.370	+.093	+.133	-.050
A Years in 4-H club work.....	+165	-.075	+090	-.260	+050	+.325	-.125	+.207	+.095	+.050	+.060	+.075	+.701	-.050
T Agricultural training in H.S.....	+150	-.325	-.010	+.105	+115	+.325	-.235	+.295	+.195	+.050	-.275	-.200	-.225	-.075
L Socio-economic status.....	+160	-.110	+045	-.095	+130	+.085	+.040	+.120	+.180	+.070	+.065	+.115	+.190	+.133
1 Statement 17.....	+122	-.375	+1250	-.380	+132	+.210	+.215	+.075	+.200	+.150	+.025	+.368	+.321	+.202
2 ".....	+340	+120	+185	-.160	+155	+.038	+.025	+.050	+.035	+.100	+.240	+.050	+.310	+.005
4 ".....	+.050	+.463	+1057	+.375	-.195	+.140	+.000	+.200	+.135	+.300	+.325	+.245	+.195	+.014
5 ".....	+160	+.250	+165	+.425	+.212	+.339	+.001	+.045	+.070	+.345	+.122	+.355	+.530	+.170
6 ".....	+.108	+.525	-.200	+.525	-.455	+.040	+.045	+.478	+.050	+.375	+.468	+.568	+.040	+.175
7 ".....	+.300	+.175	+.065	+.650	-.475	+.385	-.215	+.330	+.010	+.165	+.285	+.475	+.360	+.075
8 ".....	+110	+.430	+.105	+.335	-.050	+.250	-.002	+.325	+.050	+.065	+.110	+.115	+.570	-.067
9 ".....	+.410	-.045	+.010	+.120	-.490	+.290	+.105	+.220	+.140	+.420	+.315	+.325	+.335	-.080
10 ".....	+.045	+.320	+.025	+.120	+.145	+.040	+.060	+.295	+.053	+.145	+.138	+.172	+.228	+.120
11 ".....	+.010	+.320	+.033	+.033	+.150	+.075	+.300	+.020	+.418	+.025	+.365	+.542	+.410	+.095
12 ".....	+.120	+.455	+.033	+.850	+.850	+.185	+.200	+.395	+.025	+.101	+.140	+.205	+.280	+.245
14 ".....	+.145	+.390	+.150	+.330	+.185	+.330	+.200	+.070	+.025	+.355	+.105	+.365	+.403	+.100
15 ".....	+.040	+.120	+.075	+.330	+.200	+.075	+.065	+.155	+.020	+.025	+.105	+.295	+.365	+.095
16 ".....	+.060	+.025	+.300	+.395	+.200	+.155	+.170	+.170	+.118	+.085	+.195	+.125	+.210	+.200
17 ".....	+.040	+.120	+.075	+.330	+.200	+.075	+.065	+.155	+.020	+.025	+.105	+.295	+.365	+.095
18 ".....	+.053	+.018	+.025	+.395	+.200	+.155	+.170	+.170	+.118	+.085	+.195	+.125	+.210	+.200
19 ".....	+.040	+.120	+.075	+.330	+.200	+.075	+.065	+.155	+.020	+.025	+.105	+.295	+.365	+.095
20 ".....	+.145	+.250	+.101	+.265	+.355	+.025	+.085	+.160	+.225	+.225	+.385	+.150	+.205	+.100
21 ".....	+.138	+.365	+.140	+.160	+.105	+.260	+.195	+.025	+.310	+.385	+.325	+.375	+.160	+.030
22 ".....	+.172	+.542	+.205	+.575	+.365	+.290	+.125	+.075	+.150	+.375	+.325	+.375	+.185	+.125
23 ".....	+.228	+.410	+.280	+.403	+.365	+.210	+.295	+.205	+.150	+.160	+.185	+.190	+.190	+.100
24 ".....	+.120	-.095	+.245	+.100	+.095	+.200	+.120	+.100	+.125	+.030	+.125	+.100	+.050	-.050

*Statements 3 and 13 of the attitude test are omitted here because they were marked by too few of the boys. †Statements in attitude test.

this case (see note to Table 2, page 281) the more favorable attitude toward farm life. Distribution of scores made on Attitude I by members, past members, and nonmembers is shown in Fig. 5.

As was true also of the boys, Attitude I among the girls was associated to only a very slight extent with any of the other variables measured, according to the simple correlation coefficients and standard regression coefficients (Tables 5, 6, 7, pages 284, 286, 288).

TABLE 23.—FARM-BOY MEMBERS AND PAST MEMBERS: FACTOR LOADINGS DETERMINED BY MULTIPLE-FACTOR ANALYSIS OF THE PRINCIPAL VARIABLES STUDIED AND OF THE STATEMENTS USED IN THE ATTITUDE TEST
(527 farm boys)

Variable	Factor I ^a (+)	Factor II ^a (-)
Achievement.....	+.202	+.747
Expressed attitude.....	+.800	-.036
Age.....	+.071	+.546
Intelligence quotient.....	-.073	+.354
Years in 4-H club.....	+.367	+.422
Training.....	+.411	+.496
Socio-economic status.....	+.029	+.093
Statement 1.....	+.492	-.235
" 2.....	+.195	+.185
" 4.....	+.407	+.272
" 5.....	+.524	-.029
" 6.....	-.478	+.423
" 7.....	-.752	+.071
" 8.....	+.371	+.413
" 9.....	-.694	+.160
" 10.....	+.383	+.194
" 11.....	-.628	+.217
" 12.....	+.224	-.147
" 14.....	-.768	+.093
" 15.....	+.600	-.275
" 16.....	-.395	-.164
" 17.....	+.105	-.224
" 18.....	+.458	+.344
" 19.....	-.046	+.352
" 20.....	-.434	+.294
" 21.....	-.342	+.253
" 22.....	-.648	+.294
" 23.....	-.637	-.165
" 24.....	+.053	-.122

^aFactor I is largely an expression of Attitude I and Factor II is the expression of Attitude II

Only a slight association between Attitude I and achievement was indicated likewise by the factor analysis (Table 12, page 293) of the data for girl members and past members. Attitude I had only a slight loading on Factor I, which seems to be chiefly a measure of achievement. This loading was, however, of the same sign as achievement, which indicates that there is a slight positive association between Attitude I and achievement. It is probable, therefore, that a small part of the differences between the achievement scores made by girl members and past members was to be explained by differences in the scores

on Attitude I, but it does not seem probable that much of the difference can be accounted for in this manner.

Interest in the Possibilities of Farming and Farm Life

Boys. By means of a factor analysis of the data on attitudes, another attitude quite different from "appreciation or depreciation of farming and farm life" was measured. This second attitude, "interest in the possibilities of farming and farm life," is referred to as Attitude II (see footnote, page 281). Statements 6, 8, 18, and 19 of the attitude test were the ones which had the greatest positive association with the

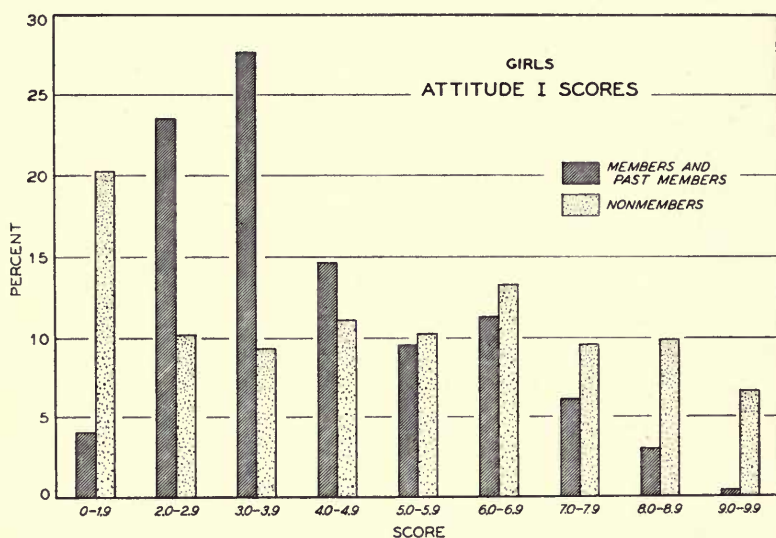


FIG. 5.—DISTRIBUTION OF SCORES MADE BY GIRLS ON TEST FOR ATTITUDE I

factor which in this analysis measured Attitude II (Table 23), while statements 1, 15, 17, and 23 were those which had the greatest negative association with that factor. In general, agreement by the boys with statements 6, 8, 18, and 19 indicated that they thought a farm to be a good place for training, for development, and for clean wholesome living; and disagreement with statements 1, 15, 17, and 23 indicated that they objected to social isolation, and believed that in most communities farm life could be much improved. The facts that there is always work to be done and that much of it consists of outdoor activities were not the reasons why these boys liked farming, nor

was the fact that farm work involves many hardships a reason for their not liking farm life.

Differences between the attitudes of members and nonmembers towards the possibilities of farming and farm life were chiefly due to differences in age and intelligence and not particularly to 4-H club work. A statistically significant difference was found between the average scores on Attitude II made by farm-boy members (33.66) and farm-boy nonmembers (32.59, Table 24). The difference of 1.07 is 3.4 times its probable error. This difference may have been due to the association of Attitude II with the other variables, however, because, on the one hand, there was a fair degree of correlation between Attitude II and such variables as achievement, agricultural training in high school, age, and intelligence, and on the other hand, because members and nonmembers differed significantly in regard to some of these variables, particularly achievement, age, and training. It may be, in other words, that 4-H club members, on the average, made somewhat higher ratings on Attitude II than the nonmembers, not because of 4-H club activities as such, but because they were older and a larger percentage of them had had high school training in agriculture,¹ and consequently possessed more information about good farm practices. The fact that the simple correlation between Attitude II and number of years in 4-H club ($+ .089$, Table 4, page 283) was so low as to be negligible indicates that 4-H club training, as such, has little effect upon this attitude, but rather that 4-H clubs tend to attract those who believe in the possibilities of farming and farm life.

Attitude II and Achievement.—Attitude II appears to be more closely correlated with achievement than does Attitude I (appreciation or depreciation of farm life).² The simple correlation between Attitude II and achievement, found by using the scores of the 527 farm-boy members and past members,³ was $+ .353$ (Table 4, page 283); whereas the simple correlation between Attitude I and achievement, found by using the scores of 525 boy members, including 57 town boys, was $+ .175$ (Table 3, page 282). The simple correlations

¹Fifty percent of the farm-boy members reported having had high-school courses in agriculture, compared with only 10.7 percent of the farm-boy nonmembers.

²The statement of results is not made more definite because the coefficients have not been calculated on strictly comparable groups. Attitude scores of 57 town boys were included in the correlation of Attitude I with achievement and other factors (see footnote, page 294).

³Simple correlation coefficients have not been worked out for town boys or nonmembers, but see page 292 for comparable factor analysis of members and nonmembers. The 527 equals 468 members and 69 past members minus 10 incomplete on the attitude section.

TABLE 24.—FARM-BOY MEMBERS* AND NONMEMBERS: DIFFERENCES IN ATTITUDE II SCORES WHEN VARIABLES ASSOCIATED WITH ATTITUDE II ARE CONTROLLED

Group	Number in group	Age (months)	I.Q.	Achievement	Average Attitude II score	Difference	D P.E.
Boys <i>without</i> agricultural training in high school							
Members	109	162	87	18.1	29.83 ± .37		
Nonmembers	98	161	89	17.3	30.35 ± .41	— .52 ± .54	1.0
Members	16	168	88	46.2	33.44 ± .92		
Nonmembers	8	174	94	46.6	37.00 ± .72	—3.56 ± 1.17	3.0
Members	60	154	110	25.8	31.52 ± .50		
Nonmembers	62	158	110	23.8	31.50 ± .51	+ .02 ± .71	.03
Members	39	166	112	48.0	35.05 ± .71		
Nonmembers	25	170	113	48.5	38.00 ± .85	+1.05 ± 1.11	1.0
Members	45	198	87	27.1	32.62 ± .72		
Nonmembers	30	201	88	22.4	33.77 ± .78	—1.15 ± 1.07	1.1
Members	24	203	91	51.8	35.25 ± .86		
Nonmembers	11	202	94	47.6	38.09 ± .87	—2.84 ± 1.22	2.3
Members	19	196	110	32.6	37.16 ± .90		
Nonmembers	15	198	109	28.6	31.27 ± .84	+5.89 ± 1.23	4.8
Members	58	206	110	54.7	35.62 ± .40		
Nonmembers	17	202	112	50.3	37.65 ± .92	—2.03 ± 1.01	2.0
Boys <i>with</i> agricultural training in high school							
Members	9	189	102	27.6	33.78 ± 1.41		
Nonmembers	7	173	92	31.7	32.57 ± 1.43	+1.21 ± 2.00	.6
Members	9	176	94	52.0	34.89 ± 1.60		
Nonmembers	2	173	98	51.5	33.50	+1.39	...
Members	3	169	102	37.3	33.67 ± 1.99		
Nonmembers	2	177	108	25.0	39.50	—5.83	...
Members	13	173	109	52.8	35.23 ± 1.95		
Nonmembers	2	171	117	58.5	34.50	+ .73	...
Members	17	200	87	32.8	31.88 ± .93		
Nonmembers	4	195	93	28.5	36.00	—4.12	...
Members	58	207	92	55.5	36.95 ± .49		
Nonmembers	5	208	91	54.8	32.80 ± 1.50	+4.15 ± 1.58	2.6
Members	2	191	106	37.0	36.50		
Nonmembers	3	207	110	38.0	33.00	+3.50	...
Members	46	203	108	62.3	36.50 ± .58		
Nonmembers	7	194	114	55.4	35.57 ± 2.92	+ .93 ± 2.98	.3
All members and nonmembers							
Members	527	182	99	39.2	33.66 ± .19		
Nonmembers	298	173	99	24.3	32.59 ± .25	+1.07 ± .31	3.4

*In this table the term members includes past members also.

between Attitude II and high-school training in agriculture, age, and I.Q. were + .269, + .258, and + .230 respectively (Table 4).

The multiple-factor analysis in which Attitude II was discovered

TABLE 25.—FARM-BOY MEMBERS AND PAST MEMBERS: AVERAGE ACHIEVEMENT SCORES WHEN AGE, I.Q., TRAINING, AND ATTITUDE II ARE CONTROLLED
(527 boys)

Attitude II	Age under 183 months				Age 183 months and over			
	I.Q. under 100		I.Q. 100 and over		I.Q. under 100		I.Q. 100 and over	
	No agriculture in H.S.	Agriculture in H.S.	No agriculture in H.S.	Agriculture in H.S.	No agriculture in H.S.	Agriculture in H.S.	No agriculture in H.S.	Agriculture in H.S.
Under 33.....	17.3	39.3	29.1	48.7	34.1	44.1	48.5	52.0
33 to 41.....	23.9	33.0	33.7	44.9	34.9	49.7	47.7	61.0
42 and up....	31.0	47.4	42.7	56.5	40.4	54.3	51.1	64.3

showed the different variables—achievement, age, training, years in 4-H club, and I.Q.—to be associated to at least a fair degree with Attitude II (Factor II, Table 23). Together with organization index, all these variables, except I.Q., were found to be quite highly associated thru a common factor which was called “adaptability to farm life” (page 290, and Table 11, page 293). The associations, or loadings,¹ of this common factor with achievement and Attitude II were + .793 and + .400 respectively,—which is further indication of the association of attitude and achievement, and at the same time shows the nature of the association.

By letting the achievement scores vary while controlling age, I.Q., training, and Attitude II, relationship between the score a boy makes on Attitude II and the score he makes on achievement may be shown (Table 25). Unfortunately in this sample the number of boys was not large enough to control adequately more variables than those mentioned above, nor to control as exactly as might be desired those that were used.²

The experiment was tried of controlling age very rigidly and getting the relation of Attitude II and achievement, without controlling the other variables. A very marked increase was shown in achievement with an increase in Attitude II (Table 26). As the attitude score

¹See footnote 1, page 292.

²The boys were divided into two groups according to age (those under 183 months, and those 183 months or over). Each of these two groups was then divided into two subgroups according to I. Q. (those under 100, and those 100 or over); each of these subgroups into three other subgroups according to Attitude II (under 3.4, 3.4 to 4.1, and 4.2 or over); and lastly each of these latter subgroups into two more subgroups according to training (those who had had agriculture in high school and those who had not). These groupings are shown in Figs. 6, 7, 8, and 9.

TABLE 26.—FARM-BOY MEMBERS AND PAST MEMBERS: AVERAGE ACHIEVEMENT SCORES WHEN ATTITUDE II AND AGE ARE CONTROLLED RIGIDLY (527 boys)

Age (months)	Achievement scores when Attitude II scores were—					
	Under 3.4		3.4 to 4.1		4.2 and up	
	Number in group	Score	Number in group	Score	Number in group	Score
Under 130.....	3	16.0	4	6.0	2	5.0
130-139.....	8	18.0	10	18.6	2	26.0
140-149.....	15	16.1	14	25.9	2	32.5
150-159.....	15	18.9	16	29.4	7	31.9
160-169.....	10	17.7	28	32.8	5	45.4
170-179.....	27	32.1	44	37.2	20	38.0
180-189.....	15	32.0	35	37.3	16	40.1
190-199.....	13	33.1	53	47.7	26	48.1
200-209.....	7	53.6	28	50.2	18	51.4
210-219.....	5	39.6	28	54.2	13	57.4
220-229.....	4	35.8	9	56.4	8	60.6
230 and up.....	2	59.0	5	58.0	10	51.4

improved, the achievement score also improved in most cases, and in some instances it improved very considerably (Table 25, and Figs. 6 and 7). In all cases the average achievement score made by the boys having the most favorable attitude toward the possibilities of farming and farm life was higher than that made by the boys having a less favorable attitude.

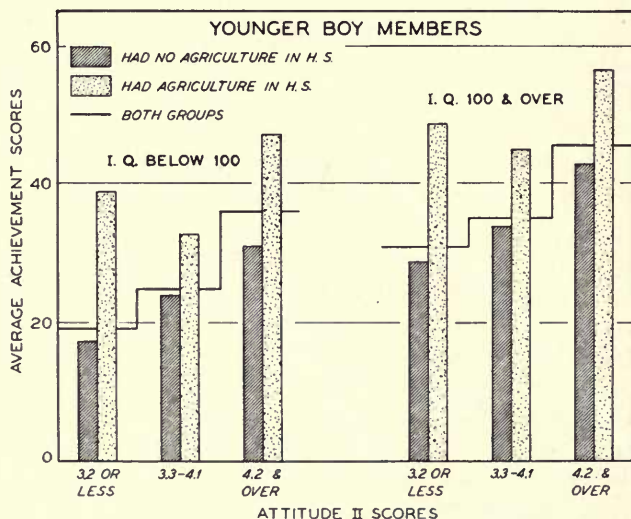


FIG. 6.—ASSOCIATION OF ATTITUDE II WITH ACHIEVEMENT AMONG FARM-BOY MEMBERS AND PAST MEMBERS ALL YOUNGER THAN AVERAGE

The relationship between Attitude II and achievement was greatly influenced by age, I.Q. and training, as is shown in Figs. 6, 7, 8, and 9. Attitude II was much more highly correlated with the achievement scores of the younger boys than with those of the older boys. For the younger boys the correlation was greatest among those who had not had agriculture in high school, while for the older boys the correlation was greatest among those who had had agriculture in high school. Also, a greater correlation was found between Attitude II and

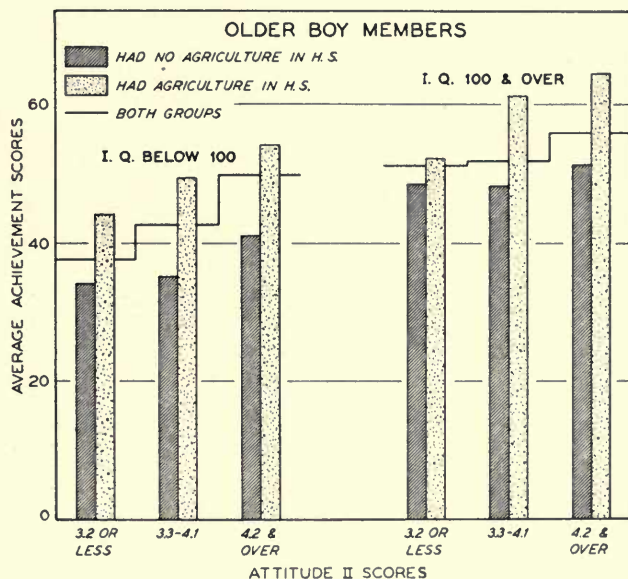


FIG. 7.—ASSOCIATION OF ATTITUDE II WITH ACHIEVEMENT AMONG FARM-BOY MEMBERS AND PAST MEMBERS ALL OLDER THAN AVERAGE.

achievement among the boys with lower I. Q. than among those with higher I. Q. In general, high achievement scores were associated with high Attitude II scores of both members and nonmembers (shown also in the analysis with achievement as the dependent variable). This association was highest among the younger boys, and especially those young boys who had not had agriculture in high school. It would appear, therefore, that the boys who already look favorably upon the possibilities offered by farming are most easily drawn into 4-H club work, and that the more capable they become the more appreciative they are of these possibilities. More emphasis might well be given to this aspect of club work by 4-H club leaders.

Attitude II and Agricultural Training in High School.—A similar analysis was made letting Attitude II scores vary while controlling, to some extent at least, age, intelligence, achievement, and high-school training in agriculture. This was done with the data of both farm-boy members and farm-boy nonmembers (Table 24).

A striking relationship between high-school training in agriculture and Attitude II was brought out by comparing Attitude II scores of those who had had training with the scores of those who had not,

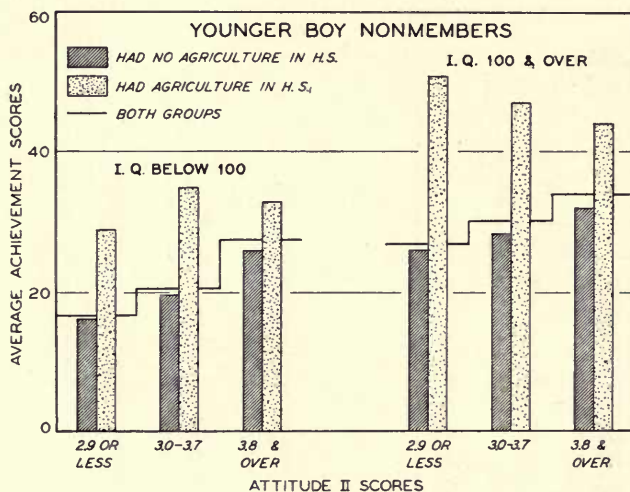


FIG. 8.—ASSOCIATION OF ATTITUDE II WITH ACHIEVEMENT AMONG BOY NONMEMBERS ALL YOUNGER THAN AVERAGE

when achievement, intelligence, and age were controlled. Attitude II scores of the member boys who had such high-school training were better, in every case except the older boys having high I.Q., than the scores of those who had not had such training. Of the older boys having high I.Q. who had low achievement scores, those who had taken no special training had higher average Attitude II scores than those who had taken such training. Probably this difference indicates that those who had found difficulty in mastering the work cared less for it. On the other hand the Attitude II scores of the younger boy members in both intelligence groups who had low achievement scores and who had taken training were high. These younger boys still saw possibilities in farming even tho they were unable to make good scores on the subject matter or science of agriculture.

In general the same relationship between training and Attitude II

was evident among the farm-boy nonmembers. Many of the group, however, had taken no training, and consequently the results were quite irregular and some of the differences not reliable.

Attitude II and Age and Intelligence.—Both age and intelligence of members were positively associated with Attitude II. Other things being equal, the older the boy members were the greater was their interest in possibilities of farming and farm life; and likewise, the more intelligent they were the greater was their interest.

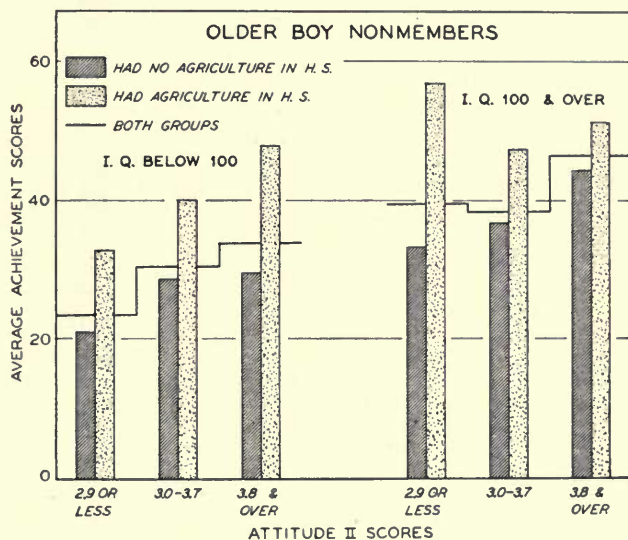


FIG. 9.—ASSOCIATION OF ATTITUDE II WITH ACHIEVEMENT AMONG BOY NONMEMBERS ALL OLDER THAN AVERAGE

Girls. A second attitude on the part of the girls very similar to Attitude II of the boys was discovered in a similar factorial analysis. This attitude of the girls is thus also called Attitude II, "interest in the possibilities of farming and farm life," tho it is not exactly the same as Attitude II of the boys. Both boys and girls gave statements 8, 18, and 19 a relatively high rating, and the girls also gave statements 20 and 21 a high rating. The girls seemed to put a little more stress on having the farm equipped with modern conveniences, being connected with town and neighbors, and being so financed that farm life is not drudgery. Both girls and boys indicated their belief that farm life could be improved in most communities.

The girls were scored on Attitude II in the same way as the boys—by weighting the statements marked by them by the loadings obtained

TABLE 27.—GIRL MEMBERS AND PAST MEMBERS: FACTOR LOADINGS DETERMINED BY MULTIPLE-FACTOR ANALYSIS OF THE PRINCIPAL VARIABLES STUDIED AND OF THE STATEMENTS^a USED IN THE ATTITUDE TEST
(768 girls)

Variable	Factor I (+)	Factor II (-)
Age.....	-.048	+.678
Intelligence quotient.....	+.047	+.243
Years in 4-H club.....	-.032	+.262
Ascendance-submission score.....	+.042	+.307
Social behavior.....	+.020	+.103
Schooling (clothes).....	-.019	+.546
Schooling (foods).....	-.026	+.555
Total achievement.....	+.007	+.770
Organization index.....	+.073	+.565
Socio-economic status.....	-.002	+.204
Attitude I.....	-.983	-.024
Statement 1.....	-.636	-.066
" 2.....	-.375	-.122
" 4.....	+.447	+.118
" 5.....	-.766	-.241
" 6.....	+.636	+.154
" 7.....	+.829	-.162
" 8.....	-.408	+.355
" 9.....	+.588	+.082
" 10.....	-.668	+.209
" 11.....	+.673	-.125
" 12.....	-.388	+.059
" 14.....	+.770	-.025
" 15.....	-.511	-.084
" 16.....	+.286	+.143
" 17.....	-.417	-.150
" 18.....	-.553	+.392
" 19.....	+.195	+.507
" 20.....	+.528	+.327
" 21.....	+.349	+.390
" 22.....	+.448	-.236
" 23.....	+.571	-.189
" 24.....	-.090	+.013

^aStatements 3 and 13 of the attitude test were omitted here because so few of the boys marked them.

from Factor II of the factor analysis (Table 27).¹ The scores thus obtained correlated higher with achievement (+.458) than did the score (+.224) obtained on Attitude I (Table 8, page 289). Also in the factor analysis (Table 12, page 293), Attitude II had a loading of +.526 with the general achievement factor (Factor I) compared to a loading of +.318 for Attitude I with the achievement factor.

Altho the girls' interest in the possibilities of farming and farm life does seem to have been associated to some extent with achievement, there appears to have been very little difference in mean scores of member and nonmember girls on Attitude II (Table 6, page 286).

That Attitude II and achievement are related, however, is shown by the data in Table 28, where age is controlled. Among the girls whose Attitude II scores were low, achievement scores ranged from 19.9 at 130 months to 29.5 at 210 months or older. Among those whose

¹Scores were adjusted for the number of statements marked.

TABLE 28.—GIRL MEMBERS AND PAST MEMBERS: AVERAGE ACHIEVEMENT SCORES*
WHEN ATTITUDE II AND AGE ARE CONTROLLED RIGIDLY
(768 girls)

Age (months)	Achievement scores when Attitude II scores were—					
	Under 3.4		3.4 to 4.0		4.1 and up	
	Number in group	Score	Number in group	Score	Number in group	Score
Under 130.....	7	19.9	16	18.0	3	23.3
130-139.....	15	16.2	30	21.4	8	19.4
140-149.....	23	19.2	52	24.8	14	28.4
150-159.....	21	25.0	43	29.5	21	36.8
160-169.....	22	25.8	51	32.0	27	41.0
170-179.....	21	30.0	56	35.9	50	39.1
180-189.....	15	29.5	46	38.6	47	43.5
190-199.....	5	29.4	31	41.4	46	44.7
200-209.....	4	40.0	18	41.3	36	51.2
210 and up.....	2	29.5	16	42.4	22	50.4

*Achievement score equals the number of right answers minus half the number wrong.

Attitude II scores were medium, achievement scores ranged from 18.0 at 130 months to 42.4 at 210 months or older; and among those whose scores on Attitude II were high, the achievement scores ranged from 23.3 at 130 months to 50.4 at 210 months or older. Thus a favorable attitude on the part of the girls towards the possibilities in farm life seems to go along with good achievement; likewise, as among the boys, girls who are already convinced of the possibilities in farm life seem to have their convictions bolstered by 4-H club work.

FACTORS STUDIED IN RELATION TO PERSONAL QUALITY

The second main objective of 4-H club work is to improve the personal quality of the boys and girls, to cultivate those characteristics which will enable them to meet social conditions successfully.

Of the measures used in this investigation, four may be considered measures of personal quality. These were (1) the attitude scale, (2) the ascendance-submission test,¹ (3) the social-behavior index, and (4) the organization index. All of these except the social-behavior index have been discussed in other connections. In the present section these four measures are considered indexes of certain

¹The Allport ascendance-submission test is designed to measure the tendency of the individual toward ascendance (dominance) or submission in his reaction to various types of social situations. The more ascendant an individual tends to be in his social relations, the higher the score he will make on this test, presumably at least.

desirable personal qualities or attributes, and in dealing with each of these measures an attempt is made to determine the effect, if any, of 4-H club membership and training upon these desirable attributes in boys and girls.

Attitudes Toward Farming and Farm Life

The two distinct attitudes actually measured by the attitude scale¹ have already been described (pages 290 and 322). The first attitude is called "appreciation or depreciation of farm life" (Attitude I). An appreciative attitude toward farm life is undoubtedly important and perhaps even necessary for adequate and happy adjustment to life on a farm. The significant differences between members and nonmembers of 4-H clubs with regard to this attitude, however, were found to be due largely to selection rather than to 4-H club training.² Appreciation of farm life is thus apparently not materially increased by 4-H club activities. Rather, 4-H club work tends to appeal particularly to boys and girls who possess this appreciative attitude to a high degree.

The second attitude, "interest in the possibilities of farming and farm life" (Attitude II), is undoubtedly a very desirable personal attribute of those who expect to live in a farming community, even apart from the fact that it is correlated with certain other measures of capability. As was pointed out on pages 290 and 325, this attitude was associated in the factor analysis with the general factor "adaptability to farm life." Both the boys and the girls who were rated high on Attitude II were apparently able to see in a farm environment possibilities for training and development and for invigorating wholesome living. They were interested in farm life, not because they were passively and uncritically satisfied with the life as it was, but because they saw possibilities of improvement.

Tho farm-boy members had a significantly better rating on Attitude II than farm-boy nonmembers (Page 323 and Fig. 10), no consistent differences remained when differences in age, I.Q., agricultural training, and achievement were controlled (Table 24, page 324). As for the girls, the mean scores on Attitude II of the members were not significantly different from those of the nonmembers (Table 6, page 286). Other variables were not controlled, however, in this analysis of the data for the girls, and it is therefore possible that a significant difference might have been found had such a control been made.³

¹See footnote 1, page 281.

²See Bulletin 426, page 276.

³Girl members were on the average younger than girl nonmembers but had higher I.Q.'s.

Evidently, then, 4-H club work as it is now organized does very little in the way of improving the attitudes of boys and girls engaged in it towards farm life, even tho superior achievement in a 4-H club apparently tends to bolster appreciation of the possibilities offered by farm life (page 323). Specific attention evidently has not been given

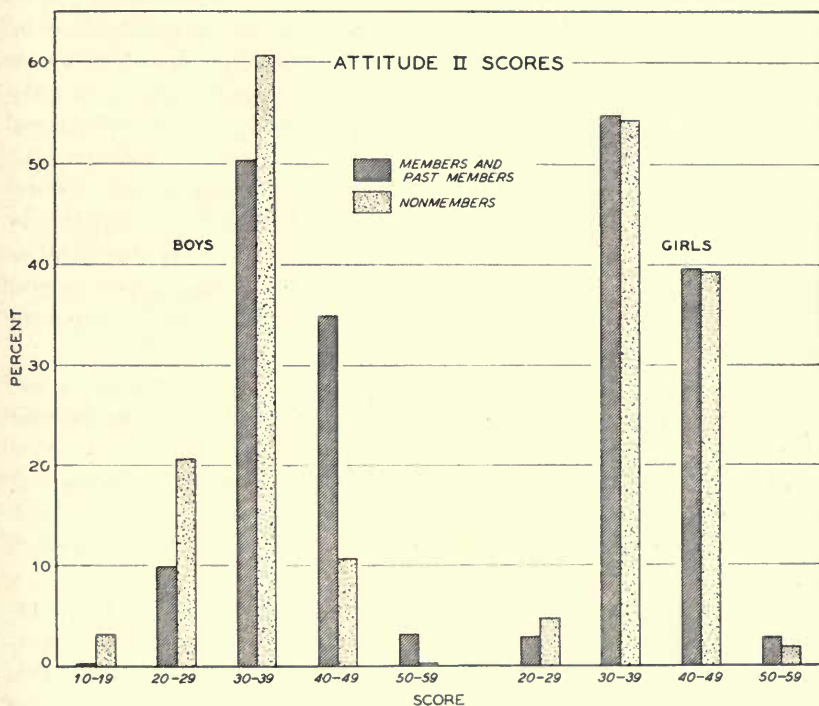


FIG. 10.—DISTRIBUTION OF SCORES MADE BY BOYS AND BY GIRLS ON TEST FOR ATTITUDE II

by 4-H club leaders to the improvement of this quality so much as to the improvement of skills. A positive interest in the possibilities of farming and farm life, however, is a very important personal quality in rural boys and girls, and greater emphasis might well be given in 4-H club work to fostering this attitude.

Ascendance or Submission

The tendency toward ascendance or submissiveness in the ordinary affairs of everyday life is of course a very important quality, and the strength of the quality and the direction it takes (that is, whether

toward ascendancy or submission) has much to do with the way in which one adjusts himself to the circumstances of his life. This tendency in this study was measured by means of the *Allport A-S Reaction Study*. The score obtained on this test is an indication of social aggressiveness or leadership—or of the lack of these qualities.

Boys. Among the boys in this study the 4-H club members were not found, according to this test, to be significantly more ascendant or aggressive in social situations than the nonmembers. The A-S scores made by the boy members averaged $35.99 \pm .391$, and those of the boy nonmembers $35.26 \pm .456$. The small difference of $.73 \pm .607$ is not significant. Moreover there was little difference in the distribution of the A-S scores of the members and nonmembers, altho more of the scores of the nonmember boys than of the member boys fell in the lower ranges. On the other hand, more of the scores of the member boys than of the nonmember boys were in the intermediate ranges. The scores falling in the higher ranges were distributed very nearly the same in both groups.

Simple correlations of the A-S scores with size of family, age, I.Q., number of years in 4-H club work, Attitude I, socio-economic status, social behavior, and achievement were all quite low, the highest for both members and nonmembers being that with organization index, not including 4-H club, + .22 and + .18, respectively.

Ascendance-submission was found to have a slightly positive association with "adaptability to farm life," of the factor analysis, and a slightly negative association with the "intelligence factor" (Table 11, page 293). Practically no association could be found between ascendance-submission and the other primary factors.¹ According to this analysis, 4-H club work has very little influence on the tendency of boy members to dominate or to be dominated in the various social situations² which they encounter.

Girls. Scores on the A-S test made by girl members of 4-H clubs ($48.49 \pm .377$) were significantly higher, on the average, than those made by the girl nonmembers ($45.60 \pm .472$, Table 6, page 286). On the other hand, the correlation between ascendance-submission and the length of time spent in 4-H club work was very slight (+ .135, Table 7, page 288). It is probable, therefore, that while 4-H club training of the girls may have done something to improve the traits measured by the ascendance-submission test, the chief reason for the difference between the members and nonmembers in this respect was probably that the

¹As determined by multiple-factor analysis using data on farm-boy members.

²See footnote 1, page 331.

4-H club work appealed more strongly to the more aggressive girls, who thus tended more readily to become members.¹

Social Behavior

The significance of the social-behavior index² in the study of the personal quality of boys and girls in 4-H club work lies in the fact that it revealed the choice of activities that were made and thus indicated the quality of group life that was sought.

In the test from which the social-behavior index was derived, only those activities which are readily available in most communities were included. These activities were visiting, attending church services, parties, fairs, movies; frequenting soda fountains, street carnivals, and dances; street loafing; and visiting roadhouses. The boys and girls were asked to indicate on the questionnaire which of these various activities their parents approved; and the "desirability" of the activity was then determined on the basis of the percentage of parents of all the boys and girls (members, past members, and nonmembers) who, according to the report, approved of the activity. The extent of parental approval³ of the various activities is discussed in the earlier report of this study.⁴ The index score on a given activity was derived by weighting the indicated frequency with which it was attended in accordance with its desirability.

Boys. According to the index scores the boy members and the boy nonmembers differed very little as to type of social behavior. The scores of the members averaged $+10.72 \pm .043$, and those of the nonmembers $+10.57 \pm .053$ (Table 2, page 281). The difference ($+ .15 \pm .068$) is only 2.2 times the probable error, and consequently is not significant. Moreover the scores within the two groups were distributed similarly. Scores of the past members were not distributed in quite the same way as those of the members and nonmembers, probably because there were fewer of the past members in the group.

According to the measurements used in this study, social behavior was not closely associated with the other variables studied. Among the members, correlation of social behavior with achievement, for example, was only $+ .125$, and with Attitude I, $+ .018$ (Table 3, page 282). Likewise among the nonmembers there was only a slight

¹See Bulletin 426, page 273.

²Devised by D. E. Lindstrom and E. L. Welker.

³Parents of members, of past members, and of nonmembers differed somewhat in regard to the approval of the various activities. These differences were indications of the selectivity of 4-H club work rather than of its results.

⁴See Bulletin 426, page 261.

positive correlation between social behavior and achievement ($+ .146$, Table 3, page 282). Data for the nonmembers were not studied by multiple-factor analysis.

Evidently, according to these correlations, farm boys see little relationship between such informal social activities as were measured by the social-behavior test, and the work and quality of farm life. Further studies involving more exact measurements, however, might reveal relationships not shown by this study.

Girls. Social-behavior index scores of the girl members and of the girl nonmembers averaged practically the same, being $+ 10.80 \pm .041$ and $+ 10.71 \pm .051$ respectively. And, as was true also with respect to the boys, very little association was found between social behavior and the other variables measured in the study among either the girl members or the girl nonmembers (Table 7, page 288). Evidently the girls also see no particular relationship between social activities and the "work" aspects of farm life.

Participation in Other Organizations

The fourth measure of the personal quality of the boys and girls in the study was an organization index weighted in accordance with participation and leadership in organizations other than 4-H clubs, and designed to measure social mindedness and leadership ability. Participation in 4-H club work was not considered in calculating the index, inasmuch as the index was designed to measure an effect of 4-H club work. The organizations were: (1) Future Farmers, (2) debate club, (3) music club, (4) dramatic club, (5) community club, (6) Sunday school class, (7) church, (8) church society, (9) Y.M.C.A. or Y.W.C.A., (10) boy scouts or girl scouts, (11) high-school class club, (12) football team, (13) basketball team, (14) baseball team, (15) track team, (16) social club, and (17) lodge. The index score was the sum of the scores for the individual organizations. The scores for the individual organizations were derived by weighting the organization in accordance with the percentage of boys or girls belonging to it, the number of years of membership in the organization, and whether the boy or girl held an office in it.

Boys. According to the organization indexes, the boy members of the 4-H clubs took a more active part in other organizations than the nonmember boys. The average score for the members was $10.66 \pm .266$ and for the nonmembers $8.37 \pm .212$ (Table 2, page 281). The difference, $2.29 \pm .310$, is 7.4 times its probable error and thus is statistically significant. Inasmuch, however, as the member and non-

member groups were not quite comparable in regard to age, achievement, socio-economic status, and attitude (Table 6, page 286), this difference in organization index may have been the result of factors other than membership in 4-H clubs. Probably a selectivity factor is involved.¹

Among the boy members organization index was positively correlated with several of the other variables (Table 3, page 282). These variables and the correlations with participation in the other organizations were: age, $+ .48$; achievement, $+ .43$; number of years in 4-H club work, $+ .29$; parental organization index, $+ .23$; ascendance-submission, $+ .22$; socio-economic status, $+ .21$; and I.Q., $+ .20$. For the nonmember boys, however, participation in other organizations was correlated to a considerably less extent with these other variables, except parental organization index ($+ .35$), and Attitude I, with which the correlation was negative ($- .24$).

According to the multiple-factor analysis also, participation and leadership in other organizations were highly associated among the boy members thru Factor I (adaptation to farm life) with achievement, age, training, number of years of membership in 4-H clubs, and Attitude II (Table 11, page 293). The loadings ranged from $+ .40$ for Attitude II to $+ .79$ for achievement.

On the other hand, in a multiple-correlation analysis of the several variables with achievement, very little if any association between organization index and achievement could be found (Table 5, page 284). That this analysis, however, may not be so nearly correct as the multiple-factor analysis is indicated by the data in Tables 13 and 14, pages 295 and 296, where organization index is controlled and achievement scores vary.

From the data available it was not possible to determine to what extent the differences in social mindedness and leadership ability between the members and the nonmembers was a result of the training received by the members in 4-H club work. At least part of the difference was probably due to selective factors in determining membership in the clubs rather than to the training received in the clubs.²

Girls. Girl members of 4-H clubs participated somewhat more in the work of other organizations than the girl nonmembers. The average of the organization indexes of the members was $9.35 \pm .185$ and of the nonmembers, $8.56 \pm .209$ (Table 6, page 286). The difference of $.79$ is, however, only 2.8 times its probable error, and is thus

¹See Bulletin 426, page 272.

²See Bulletin 426, pages 270-272.

merely on the border line of statistical significance. Probably the difference, tho a slight one, is real.

According to the simple correlation between organization index and number of years in 4-H club work ($+ .303$), girls who have been members of a 4-H club for a number of years are likely also to belong to and hold office in other organizations (Table 7, page 288). It is impossible to tell from the present data whether this tendency was due to 4-H club training or to selectivity; but, as can be seen from the discussion given in Part I, several of the factors bearing on the point favor selectivity.

SUMMARY AND CONCLUSIONS

Scores made on tests administered to 2,263 boys and girls living in sixty communities in six counties in Illinois furnished the statistical material for the present analysis of the effectiveness of 4-H club work in developing the capability and personal quality of the boys and girls. Of the 2,263 boys and girls, 1,124 were members of 4-H clubs, 277 were past members, and 862 were nonmembers. The data derived from the tests were analyzed by the use of simple frequency, simple and multiple correlation, and multiple-factor analyses. In an earlier report of this study of 4-H clubs made in Bulletin 426 of this Station, the circumstances which appear to influence boys and girls to become and to remain members of 4-H clubs were discussed.

Simple and multiple correlation analysis and multiple-factor analysis of the data pertaining to comparable groups of members, past members, and nonmembers led to the following conclusions regarding the effects of 4-H club training on the capability and personal quality of the members.

Capability. Capability of the boys and girls was measured by achievement tests (answers to questions on the subject matter covered by 4-H club work) and by prize indexes (number or size of prizes or awards made in 4-H club competition); and the possible influence of such factors as 4-H club training, general adaptability to farm life, agricultural or home-economics training in high school, and attitudes toward farm life and its possibilities in developing capability was measured by correlations and factorial analysis.

In general, 4-H club training was found to have a direct effect upon capability as measured by the achievement test, but the indirect effect of this training thru such avenues as adaptability and attitudes toward farm life was not so strong as had been expected. The increase in capability resulting from 4-H club work was especially noticeable among the boys who had taken no agriculture in high school but who had carried on beef, sheep, or corn 4-H club projects, and among the girls who had not had home economics in high school.

Likewise when capability was measured by prize indexes, 4-H club work appeared to increase the capability of both the boys and the girls. Members of 4-H clubs had won larger prizes or had won prizes more often than past members. Inasmuch, however, as prize winning was not closely associated with either achievement or adaptability to farm life, it is evident that the emphasis had been upon prize winning as an end in itself rather than as a means to other ends. The analysis raises the question whether more emphasis upon some other motivating

force, such as opportunity to prepare for farm life, would not be desirable in 4-H club work.

Appreciation or depreciation of farm life, contrary to expectations at the start of the study, could not be used as an indirect measure of capability even tho the members and nonmembers differed significantly with respect to this attitude. For one reason, this attitude was not associated to any marked extent with achievement; and for another, the differences between the members and nonmembers with respect to it were probably due in considerable extent to selectivity rather than to 4-H club training.

A second attitude, "interest in the possibilities of farming and farm life," was associated with achievement, and farm-boy members made higher scores on this attitude than farm-boy nonmembers. The difference, however, appeared to be associated with differences in other variables as much as with membership in 4-H clubs, and consequently 4-H club training could not be credited with all the improvement in the attitude of its members with respect to interest in the possibilities of farming and farm life.

Personal quality. The effectiveness of 4-H club training in improving the personal quality of the boys and girls enrolled was studied in connection with four traits or qualities—attitudes, ascendancy or submission, social behavior, and participation or leadership in organizations other than 4-H clubs.

Members of 4-H clubs, both boys and girls, had in general a more appreciative attitude toward farm life than nonmembers. This difference may have been partly due to 4-H club training, but it resulted also in part from the fact that young people with the more appreciative attitude tended to join 4-H clubs whereas those who were less appreciative tended not to join.

Boy members had in general a greater interest in the possibilities offered by farming than nonmembers. Membership in 4-H clubs was responsible to some extent for this difference, tho when age, I.Q., achievement, and training in school were controlled the difference itself was not so pronounced. Girl members did not differ significantly from nonmembers in attitude toward the possibilities offered by farm life.

Work in a 4-H club apparently had very little influence on the tendency of boy members to dominate or to be dominated in the various social situations encountered by them. The boy members did not differ significantly from the nonmembers in scores on the A-S test. Among the girls, on the other hand, there was a significant difference between

members and nonmembers in this respect, tho it is probable that the difference was the result of selectivity more than of 4-H club training.

Social behavior of both boy members and girl members, as measured by the social-behavior index, was only slightly associated with 4-H club training.

Members of 4-H clubs, both boys and girls, gave indications, according to the organization indexes, of having greater social-mindedness and more leadership ability than nonmembers. It was not possible to determine, however, whether the difference was due to 4-H club training or to selectivity. Probably 4-H club training did have some influence toward improving the tendency of the members to participate in and take positions of responsibility in organizations other than 4-H clubs.

The general conclusion derived from this study of the effectiveness of 4-H club work is that these clubs have brought about improvement in the capability of their members in the fields represented by their 4-H club work, especially of those members who have not had special training in school in agriculture or home economics. They have also apparently been instrumental in improving to some extent the personal quality of members, particularly in connection with participation in organized activities. Nevertheless it is clear that 4-H club work has been less effective in improving either capability or personal quality (as these were measured in this study) than was expected at the outset. Club work is apparently less effective in these respects than many leaders believe it to be. Probably, therefore, certain adjustments in the scope and content of the work are needed in order to make the clubs as effective as they should be. Such adjustments, in addition to pointing more specifically toward the improvement of capability and personal quality, might be designed to make the club work more attractive to the many boys and girls who are good membership timber but who are not now reached by the work.

However, before more than general recommendations can be made for the guidance of 4-H club work, further study is needed. Several exploratory methods have been used in the present study, and the findings need to be tested in the light of further studies involving, perhaps, some refinement of methods and, what may be even more important, the accumulation of a larger body of factual data on the effect of 4-H club work on the capability and the personal quality of the boys and girls who participate in it.

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