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A STUDY OF THE EFFECTS OF INCREASED COUNTY 4-H MEMBERSHIP ON CERTAIN VITALITY FACTORS IN OREGON AND MICHIGAN

Thesis for the Degree of M. S.

MICHIGAN STATE UNIVERSITY

H. Joe Myers

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by

H. Joe Myers

A THESIS

Submitted to the College of Agriculture of Michigan State University of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

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Approved George H. Aplin

ABSTRACT

One of the significant questions being raised by those who work with the youth program (4-H Club Work) of the Cooperative Extension Service is how can the resources of the Cooperative Extension Service be more effectively used to serve the increasing number of youth living on the farms and in rural and suburban areas.

Recognizing the wide range of 4-H members enrolled per county this study attempts to determine if a similarly wide range exists in the number of 4-H members per agent day devoted to 4-H. Finding such a range what then is the effect on certain other vitality factors (i.e. average age of 4-H members, average tenure of 4-H membership, percentage of completion, and percentage of reenrollment).

Data were taken from the 1958 and 1959 annual statistical reports, FES-21, for all counties in Michigan and Oregon. Mean values were determined for counties in the first and fourth quartiles, when counties with one or more agents designated as county extension agents (4-H) were rank ordered according to number of members per agent day devoted to 4-H. Mean values were also determined for all counties and for counties having one or more county extension agents (4-H). Mean values were compared with t tests. Coefficients of correlations were run using data from all counties to determine what correlations currently exist between each of the vitality factors.

The factors chosen are not to be interpreted as direct measures of quality or success in a 4-H club program. They may, however, be indicators of progress and or indirect measures of success.

Number of members enrolled and number of members per agent day devoted to 4-H were twice as large in the first quartile as in the fourth. All other factors were slightly larger in the fourth quartile. The results were similar for both states, except for percentage completion. Oregon showed a higher percentage completion in the first quartile than in the fourth.

Data from all counties in Michigan showed no significant correlation between number of members per agent day devoted to 4-H and average age, average tenure, percentage completion, or percentage reenrollment. Oregon showed significant negative correlation between number of members per agent day devoted to 4-H, average tenure of 4-H membership, and percentage of reenrollment.

Individually the factors produce a statistically significant difference indicating longer tenure, higher completion, and greater reenrollment could be expected in counties with smaller enrollments. When considered in combination the larger enrollments produce a significantly larger "exposure factor". The study indicates that number of members per agent day devoted to 4-H and number of members enrolled per county can be increased without serious sacrifice of average age of 4-H member, average tenure of 4-H membership, percentage of completion or percentage of reenrollment.

This study provides statistical indications. Further investigation and field study is needed to determine the cause and effect of the differences revealed before definite conclusions or recommendations can be drawn.

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CHAPTER I

INTRODUCTION

"Four-H Club Work through out the nation, as well as in many of the free countries of the world, has made rapid and commendable progress. Professional workers and volunteer leaders associated with this significant youth program of the Cooperative Extension Service have just cause to be proud of their accomplishments. At the same time, however, the question is being asked as to how the resources of the Cooperative Extension Service can be used more effectively in serving the increasing number of youth living on farms and in rural and suburban areas."[1]

It is toward the above question and one other, "What is the desirable work load of the county extension worker doing youth work?"[2] that this study is directed.

Four-H Club work is conducted in a variety of ways and utilizes a number of organizational procedures. Through all of these various methods, however, there is one common thread. Within each county extension staff there are one or more people professionally responsible for the 4-H club program. This responsibility may be only one of many held by agents working in agriculture or home economics, it might be the sole responsibility of one individual, two or more people may devote full time to 4-H club work, or there may be a combination of these.

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[1] "Report of National 4-H Evaluation Committee", January, 1959, p. 1.

[2] Ibid, p. 4.

Whatever the method of staffing, one common denominator is the number of agent days devoted to 4-H club work.[3] Hence, this will be the major foci used throughout this study.

For over twenty years, various "Statistical Measurements of 4-H Club Work"[4] have been used in the examination of local club, county, and state 4-H programs. "Although measurements of participation are not valid in evaluating the educational undertaking they may be indicaters of progress."[5]

More recently E. W. Aiton, Director, 4-H Club and YMW Programs, Federal Extension Service, U.S.D.A. identified what he chose to call "Vitality Factors".[6] These vitality factors are defined as elements or features of Extension 4-H Club programs which are positively related to the achievement of recognized objectives and purposes of 4-H club work.[7]

Aiton lists a total of nine factors of which six will be considered in this study. The three that are not being included deal with (1) percent of potential rural youth 10 - 12 served by 4-H, (2) percent of potential 14-20 year olds served by 4-H, and

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[3]"Facts and Trends - Wisconsin 4-H Club Program, 1955", State 4-H Club Office, College of Agriculture, University of Wisconsin, Madison, Wisconsin, pp. 16-17 as appears in Selected Readings on Effective Extension Work in 4-H Club and YMW Programs, edited by Robert C. Clark, May 1955.

[4]Barnard C. Joy, Statistical Measurements of 4-H Club Work, Cooperative Extension Work in Agriculture and Home Economics, Extension Service Circular, 270, October 1937.

[5]Ibid, p. 2.

[6]E. W. Aiton, "Background and Design for a Study of Vitality Factors in 4-H Club Programs", Ph.D. Dissertation, Education, University of Maryland, 1956.

[7]Ibid, p. 9.

(3) percent of 4-H membership that is 14 - 20 years old. One and two deal with potential youth, a figure that is defined differently by states and even by counties within the same state. Use of census figures would have required using figures nine years old and no longer accurate. The author does not feel that to say all youth of 4-H age are potential 4-H members is realistic. Certain youth may not have need for, nor desire to belong to 4-H clubs. While a valuable factor in local situations, percent of potential did not serve a useful purpose in this study; hence, the decision to eliminate the two factors dealing with percent of potential. This study is concerned with the total number of members enrolled per county and since this includes the 14 - 20 year olds it was not deemed desirable to focus attention on one special age group.

The six factors to be considered are:

1. Number of 4-H members per year of Extension Agents time devoted to 4-H. Since a work year is not a very explicit term, it was decided to use members per agent day devoted to 4-H. This is a more exact figure and is obtainable directly from the annual reports currently prepared by all extension agents, the F.E.S.-21.[8]

2. Number of 4-H members per county. This is a readily available figure and represents the number of different boys and girls who officially enroll in 4-H club work.

3. Average age of 4-H members. According to Dr. Aiton, average age may tend to flatten out and be somewhat unsatisfactory as an indicator of vitality.[9] It is computed by multiplying number of

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[8]Annual Report of County Extension Agents, Cooperative Extension Work in Agriculture and Home Economics, Federal Extension Service, Washington, D. C.

[9]Aiton, op. cit., p. 117.

4-H members in each age by that age, totalling the results and dividing the sum by the total number of 4-H members.

4. Average tenure of 4-H membership. This is computed by multiplying the number years of membership by the number of members in each one-year experience bracket, totalling the result, and dividing by the total number of 4-H members enrolled.

5. Percent of reenrollment. Aiton suggests that this is perhaps the most significant of the nine factors used.[10] It can be computed for any two successive years. From the 1959 enrollment subtract the number of first year members. The remainder is divided by either the 1958 enrollment or the 1958 completion figures. Since a member is not given credit for the year's work unless he or she satisfasterily completes, the writer chose the 1958 completion figures. The resultant is the percentage of 1958 members who completed projects, and who reenrolled for 4-H work in 1959.

6. Percent Completion. Is computed by dividing the number of members completing by the number of members enrolled during any one reporting year.

The six vitality factors listed above will be extremely useful as indicators or evidences of vitality in state, county, or local 4-H programs. They are not educational end-products in themselves. The objectives and goals of Extension youth work are the advances in knowledge, skills, and attitudes that may result from 4-H programs. But one of the practical problems of Extension leaders is to find identifiable factors and symptoms which are associated

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[10] Aiton, op. cit., p. 118.

with 4-H programs that bring about desirable educational achievement.....It is believed that the factors listed will be of considerable assistance in the process of identifying and later studying intensively, county and local 4-H programs with high vitality.[11]

With an ever-increasing number of youth to be served there appear to be two approaches to extending the program, (1) additional county extension personnel, (2) improved methods of working with voluntary leaders.[12] This study assumes that improved methods are the most logical approach.

Within the 4-H club program of any state there are wide variations in the number of club members enrolled per given county. In 1959 the range was from 80 to 3,256 for Michigan counties and from 129 to 2,266 for Oregon counties.

Since such a wide range is found within the counties of these two states this study will attempt to determine if there is an equally wide range in number of agent days devoted to the 4-H program and if any relationships can be determined between these two factors and the other four factors mentioned earlier.

This study is intended to be exploratory in nature and as such will be limited to the six "Vitality Factors" previously identified. In no way is it intended to imply that these factors are the only ones that might be examined. Nor is the selection of these six factors an indication that they, in themselves, are a measure of quality or success of 4-H club work. However, for over

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[11] Aiton, op. cit., p. 119.

[12] T. T. Martin, The 4-H Leader's Handbook, Harper and Brothers, New York 16, New York, 1956, p. 134.

twenty years they have been considered as methods of measuring the relative success of 4-H Leaders,[13] and currently are considered among the "Factors to consider in analyzing the county 4-H club program."[14] It is felt that these factors will give information to indicate if more detailed research in this area would be profitable.

Data was secured from two states, Oregon and Michigan. Separate statistics were then prepared for each state. Through the use of two widely separated states it is hoped that the results may be more meaningful and useful than if only one state were used.

Some of the questions to which answers are sought follow: As the number of club members per agent day devoted to club work rises, what happens to the other five vitality factors? Is there any relation between the number of members enrolled in a county and the other factors? Since all of the factors are generally, if not always, considered as being items to increase, are they positively correlated one with the other?

In addition to using data from all of the counties in each state, it is felt desirable to examine separately those counties in which one or more agents are employed who carry the tithe of County Extension Agent (4-H). Here we are attempting to determine if there is any difference between each of the six vitality factors for those counties in the first and fourth quartiles based upon number of club

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[13] A Study of 4-H Club Local Leadership in St. Lawrence County, New York, Bert J. Rogers, Extension Service Circular 314, August, 1939.

[14] Mimeograph 250, April 1958, Agricultural Extension Service, University of Minnesota, 1958.

members per agent day devoted to 4-H club work. It is readily admitted that total population, geographic distance, and many other variables might be at work in any given situation; however, for purposes of this study we are only interested in attempting to determine the interrelations between the six vitality factors.

It is realized that the accuracy of agents reporting of days devoted to 4-H might be questioned. Here it must be assumed that agents' conscientiously report to the best of their knowledge and that any errors would be fairly constant from county to county. No more accurate data could be secured without establishing some special form of reporting. Such procedure would require at least a full calendar year to do, and results would be still subject to question. This procedure was considered beyond the scope of this study.

Hypothesis

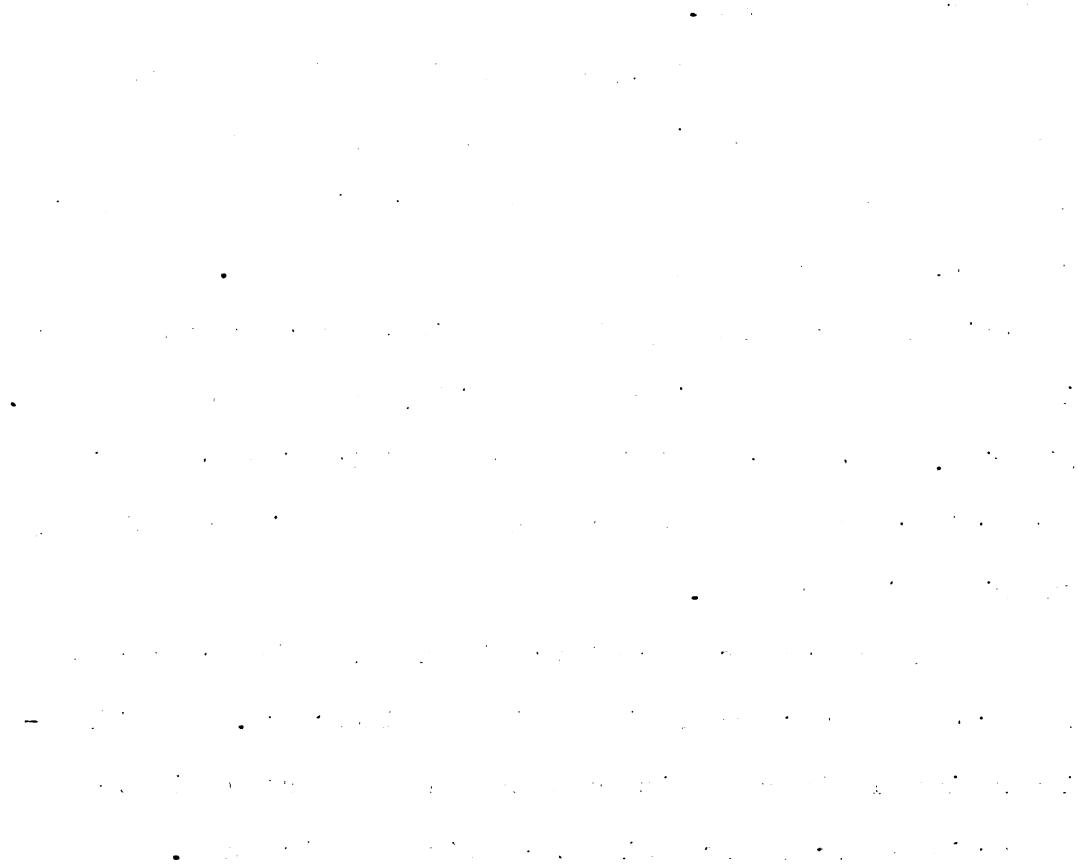
The major hypothesis of this study is that as the number of members per agent day devoted to 4-H club work increases there is a corresponding increase in the total number of club members enrolled. That there is no significant shift or loss in the other four vitality factors, (i.e., average age of members, average tenure of members, percentage completion, and percentage reenrollment).

Conversely, the larger the number of members enrolled per county the smaller the amount of extension agent time devoted per 4-H club member. As the number of members enrolled increases there is no significant change in the four vitality factors of average age of members, average tenure of members, percentage completion and

percentage reenrollment.

Acceptance of this hypothesis will tend to confirm the proposition that statistically these vitality factors will not necessarily change when a County 4-H program increases in numerical size, with or without additional extension staff. The above proposition is supported by the contention that as size of program increases the amount of involvement of lay people becomes greater. Likewise, the number of different opportunities for an individual member increases, and hence, the chances of his having a satisfying experience is increased.

In the early stages of the study, the author conducted a rather extensive search of the available literature. The following review of literature is presented in an effort to aid the reader in better understanding the basis for this study.



CHAPTER II

REVIEW OF LITERATURE

Although studies of extension activities have been conducted for nearly forty years[1], few investigate the relationships between agent load or size of county program and other vitality factors or indices of success and efficiency.

Max C. Grandy[2] indicates in his study that "changes in the percentage and total amount of county worker's time devoted to 4-H club work had no measurable influence on the percent of projects completed".

Bernard D. Joy, Agriculturist Extension Surveys and Reports Section, U. S. D. A. has on several occasions made studies of enrollment per extension agent. He indicates that "a measure of the volume of 4-H club work is the relation of membership to the extension budget or personnel. Its purpose is to picture the scope of the work in terms of available paid leadership".[3] It is a more satisfactory measure of volume than total enrollment because it makes allowance for the differences in the size of counties or states, and the number of people on the extension staff. Whether a

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[1] "A Study of the Factors in the Efficiency in Boys and Girls Clubs", W. W. Charter, and James H. Greene, School Science and Mathematics, Vol. 21: 335-341, Mt. Morris, Illinois, 1921.

[2] Max C. Grandy, Statistical Analysis of 4-H Club Work in Colorado, 1926-46, Colorado Agriculture College Extension, 44 p. typewritten, Fort Collins, 1946, p. 32, quoted in Review of Extension Studies, 1946-47, Extension Service Circular 449, U.S.D.A., March 1948.

[3] Statistical Measurements of 4-H Club Work, Extension Service Circular 27-, October 1937.

portion of each agent's time or the full time of specific agents is devoted to 4-H club work the enrollment per county extension agent is a measure of the number of boys and girls reached per unit of extension time or money.[4] With increased size of staff, which in many instances has led to specialization, the use of members per agent day devoted to 4-H seems to reinforce and refine Joy's reasoning for the use of enrollment per extension agent in his study.

While Aiton chose to call the six items "Vitality Factors"[5] most of them have been used individually or in various combinations for a number of years. The most recent study refers to completion, reenrollment, and member tenure as measures of "statistical performance".[6] Earlier West Virginia Extension Service had referred to these same items as "measures of performance"[7] to compare one type of club against the other.

The average percentage of completions by club members and the average percentage of reenrollments of club members were used by Bert Rogers in attempting to determine the relative success of leaders.[8]

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[4] Statistical Analysis of Trends in 4-H Club Work, Extension Service Circular 247, August 1936.

[5] Aiton, op. cit.

[6] The Learning Experiences of Youth Groups--A study of 4-H clubs in Barbour County, West Virginia, West Virginia University, Agricultural Experiment Station Bulletin 427, May 1959, p. 4.

[7] Comparisons of School and Non-School 4-H Clubs in West Virginia, Agricultural Extension Service, West Virginia University, Misc. Publication No. 11, January 1952.

[8] Bert J. Rogers, A Study of 4-H Club Local Leadership in St. Lawrence County, New York, Extension Service Circular 314, August 1939.

Paul J. Dixon, in a Masters thesis at the University of Maryland[9], studied several possible methods of evaluating the effectiveness of 4-H local leaders. Of those studied, he arrived at three methods that he felt were practical and had a definite relationship to the degree to which a 4-H club leader was successful in guiding 4-H club members toward the objectives of 4-H club work. Of these three, two are being used in this study, namely, percentage of members completing and percentage of reenrollment.

Club enrollment (number of members) and percentage of members completing their projects are listed by Willman as some of the ways of measuring achievement in a 4-H Club.[10] Similar studies for organizations other than 4-H appear to be virtually non-existant; however, the Boy Scouts of America list among methods of measuring results such items as: (1) percentage of boys in each rank, (2) percentage of scouts lost, (3) annual cost per scout - exclusive of permanent, camp site, etcetera.[11]

That certain of these factors are being currently used is shown in the procedure for county analysis as outlined by the State 4-H Club Office, University of Minnesota, St. Paul, Minnesota.[12]

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[9]Paul J. Dixon, "Evaluation of Criteria for Effective Local Leadership", Master thesis, University of Maryland, May 1939, quoted in "4-H Club and Older Youth Studies, 1940-41", Extension Service Circular 373, November 1941 by Bernard D. Joy.

[10]H. A. Willman, The 4-H Handbook, Comstock Publishing Associates, Ithaca, New York, 1952, p. 24.

[11]Community Boy Leadership, Boy Scouts of America, 200 5th Avenue, New York, 1926, pp. 309-319.

[12]"Minnesota 4-H Club Facts and Trends, 1959 Program", State 4-H Club Office, Agriculture Extension Service, Institute of Agriculture, University of Minnesota, St. Paul, Minnesota.

In this publication national and state figures for (1) average tenure of club members, (2) median age of club members, (3) percentage of reenrollment are provided together with blank spaces where computed figures for a county may be recorded for comparative purposes. Among other factors to be considered in analyzing the county 4-H club program are percentage of members completing, size of enrollment, and number of club members per agent year of time spent on 4-H club work.

While, as mentioned above, no studies were located that dealt specifically with all of the factors listed in this study. There were several that showed relationships between two or more of the factors. Probably, in terms of this study, the most significant was Joy's statement that "States that have a low 4-H club enrollment per agent sometimes use as justification that larger number of members would mean a lower quality of work. If percentage of completions and percentage of reenrollment are used as measures of the quality of 4-H club work, the data for 1938 would indicate the opposite to be true. The sixteen states with lowest enrollment per county extension agent have a lower average percentage of completion and a lower percentage of reenrollment than states with larger enrollment per county. It does indicate that states have developed large enrollments without a loss in the quality of 4-H club work being done as measured by the percentage of completion and the percentage of reenrollment."[13] He goes on to indicate that four statistical measures of 4-H club work that

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[13]Bernard D. Joy, Twenty-five Years of 4-H Club Work, Analysis of Statistical Trends, Extension Service Circular 312, 1939, p. 9.

are best indicators of its scope, appeal, and influence are:

1. Enrollment per county agent.
2. Percentage of eligible young people reached.
3. Percentage of members who reenroll.
4. Percentage of members who complete their projects.

More recent studies by Sabrosky indicate that usually completion is closely related to reenrollment.[14] In a study of first year members it was indicated that there is a correlation between age and completion of project work...the older the first year members are, the smaller the proportion of them who complete a project.[15]

In the West Virginia study mentioned earlier, it was found that "the age of club members was not significantly related to individual learning-experience scores, but length of club membership was."[16] (An individual learning experience is defined as a set of acts performed in relation to some 4-H club goal or a state of knowledge, which has been the result of specific phases of the club program.)

Rogers and Joy both indicate a relationship exists between completion and reenrolling.[17,18]

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[14] Laurel K. Sabrosky, Data Relating to Individual 4-H Club Project Enrollments and Reenrollments, U.S.D.A. Extension Service, October 1950, p. 11.

[15] Tables of Data from Western Region 4-H Study of First Year Members, 1949, Federal Extension Service, U.S.D.A., April 1950, p. 17.

[16] (West Virginia Bulletin 427), op. cit., p. 7.

[17] (Extension Circular 314, Rogers), op. cit., p. 22.

[18] (Extension Circular 247, Joy), op.cit., p. 10.

Nationally, the average length of membership (tenure) is approximately two and two-thirds years.[19] As an educational organization the desirability of tenure is borne out in studies such as Olson's[20] and Shinn's.[21] Olson found that various levels of 4-H experience showed a significant relationship to adoption of improved farm practices. Further, that this relationship showed a definite increase as the number of years of participation in the 4-H club program increased. Shinn concludes that if the greatest values are to be derived from 4-H club training and experience the challenge to those responsible for the formulation and execution of the 4-H club program is to exert the greatest effort to secure reenrollment for as many years after the first as it is possible.

While subject matter training is an important part of the 4-H club program the involvement of people in all phases of the program is equally important. In New England it was found "...that clubs enjoying long tenure of membership are those in which programs are planned jointly by the members and the leaders".[22]

Since 4-H club work is a voluntary youth program and as such is dependent upon voluntary local club leaders for the operation of

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[19]James H. Copp, Robert C. Clark, Factors Associated with Reenrollment in 4-H Clubs, Research Bulletin No. 195, Agriculture Experiment Station, University of Wisconsin, 1956, p. 40.

[20]Kenneth S. Olson, "The Relation of Selected Farmers 4-H Experience to Their Adoption of Improved Farm Practices," Summary of Ph.D. thesis, University of Wisconsin, 1959, p. 4.

[21]Erwin H. Shinn, A Study of a Group of 2,453 Former 4-H Club Members in 11 States, Extension Circular 342, September 1940.

[22]4-H Club Work and High School Youth, A New England Cooperative Extension Publication, issued by the Extension Service, Massachusetts State College, May 1947, p. 7.

the local club, the agents concept of his role will have a great deal to do with his or her ability to conduct an effective program serving a large number of members. Shaffer indicates that one of the main tasks of workers in this field is to organize and coordinate the efforts of adult volunteers to carry on the program of their agency. Thus, the professional in youth work is misnamed since in most cases he works with adults instead of working directly with young people.[23]

As the sheer size of enrollment increases those responsible for the program in the county extension office will tend to see their role more as an organizer, stimulator, and educator of the group which employs him. It is not his function to attempt to act as group leader; insofar as he does so, he prevents the best social organization of the group with which he is entrusted.[24]

Lindeman summarizes the role of the professional when he says, "To the extent that the professional leader recognizes his role and plays his part as a leader of leaders will he be successful in building up strong group life and will he leave it a permanent legacy, for which his memory will be blessed."[25]

While readily admitting that statistical measures, in themselves may not be direct measures of the success or quality of an

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[23]Robert H. Shaffer, Professional Opportunities in National Youth Serving Organizations, Western Personnel Institute, 30 N. Raymond Avenue, Pasadena, California, 1949, p. 5.

[24]Dwight Sanderson and Robert A. Polson, Rural Community Organization, John Wiley and Sons, Inc., New York, 1939, p. 380.

[25]E. C. Lindeman, The Community, Associated Press, New York, 1921, p. 190.

educational program, it appears that ample evidence is available that the various factors being used in this study are generally accepted as "indicators of progress".[26]

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[26](Extension Service Circular 270), op. cit., p. 2.

CHAPTER III

METHODOLOGY OF STUDY

The major hypothesis of this study is that as the number of members per agent day devoted to 4-H club work increases there is a corresponding increase in the total number of club members enrolled. That there is no significant shift or loss in the other four vitality factors (i.e., average age of members, average tenure of members, percentage completion, and percentage reenrollment).

Serving as tests of this hypothesis are the following statistical hypotheses:

1. The number of members enrolled per county is positively correlated with the number of members per agent day devoted to 4-H.
2. Number of members per agent day devoted to 4-H is positively correlated with, or will show insignificant correlation with:
   a. Average age of 4-H members.
   b. Average tenure of 4-H membership.
   c. Percentage of completion.
   d. Percentage of reenrollment.
3. Number of members enrolled per county is positively correlated or will show insignificant correlation with:
   a. Average age of 4-H members.
   b. Average tenure of 4-H membership.
   c. Percentage of completion.
   d. Percentage of reenrollment.

4. Average age of 4-H members is correlated with:
   a. Average tenure of 4-H membership.
   b. Percentage of completion.
   c. Percentage of reenrollment.
5. Average tenure of membership is correlated with:
   a. Percentage of completion.
   b. Percentage of reenrollment.
6. Percentage of completion is correlated with percentage of reenrollment.
7. When counties with one or more agents designated as County Extension Agents (4-H) are divided into quartiles by number of members per agent day devoted to 4-H there are significant differences in:
   a. The number of members enrolled per county.
   b. Number of members per agent day devoted to 4-H.
8. When counties with one or more agents designated as County Extension Agents (4-H) are divided into quartiles by number of members per agent day devoted to 4-H there are no significant differences in:
   a. Average age of 4-H members.
   b. Average tenure of 4-H membership.
   c. Percentage of completion.
   d. Percentage of reenrollment.
9. When counties with one or more agents designated as County Extension Agents (4-H) are divided into quartiles by number of members per agent day devoted to 4-H those counties in the

first quartile have a significantly higher exposure factor[1] than those in the fourth quartile.

To test these hypotheses original data were secured from the annual reports (F.E.S.-21) for each county in Michigan and Oregon. In Michigan there are four situations where two counties are served from one extension office. In these cases the two counties were treated as one identity. This gave seventy-nine sets of data for Michigan. The City of Portland, Oregon operates as a separate entity for purposes of 4-H club work; therefore, Oregon supplied thirty-seven sets of data.

The original F.E.S.-21 reports contain the data desired in the following forms:

1. Total days devoted to 4-H club work.
2. Total members enrolled.
3. Number of members enrolled for each year of member age.
4. Number of members enrolled for each year of prior club experience satisfactorily completed.
5. Number of members completing.

Data for Michigan were processed on IBM cards. Following the procedures included in the definitions of terms reported earlier, page 3, the desired factors were computed electronically for Michigan. Oregon data were machine computed and the final results punched into IBM cards. The resultant information is listed in Appendix A, Tables I and II.

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[1]Exposure Factor - Number of members enrolled multiplied by the average tenure of club members.

In consultation with Dr. William D. Baten,[2] coefficient of correlation[3] was selected as the test for the first six hypotheses and is expressed as:

$$r_{xy} = \frac{\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{N}}{\sqrt{\left[\Sigma x^2 - \frac{(\Sigma x)^2}{N}\right]\left[\Sigma y^2 - \frac{(\Sigma y)^2}{N}\right]}}$$

Where rxy is the rho coefficient, x and y the two sets of data being compared, and N the number of items in the sample.

This procedure makes it possible for us to measure the tendency of variables to change or not to change their values together. It is realized, however, that to establish that two things tend to change or occur together is not to establish that they are related directly or even indirectly by a cause-effect relationship.[4]

Use of this coefficient of correlation will allow inferences to be made as to whether or not there is a statistically significant correlation and the direction of such correlation.

A total of fifteen correlations were run making it possible to arrive at all feasible correlations of the six factors under study.

To test hypotheses seven through nine it was necessary to rank order counties with one or more agents designated as County Extension Agents (4-H) according to the number of members per agent day devoted to 4-H. For Oregon this was thirty-one counties and for Michigan fifty-four. Complete data for counties in the first and

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[2]William D. Baten, Experiment Statistician, Michigan Agricultural Experiment Station.

[3]James E. Wert, Charles Neidt, J. Stanley Ahmann, Statistical Methods in Educational and Psychological Research, Appleton-Century-Croft, Inc., New York, 1954, p. 83.

[4]Russell L. Ackoff, The Design of Social Research, The University of Chicago Press, 1953, p. 68.

fourth quartiles are in Tables III and IV, Appendix A. Since there was a tie for eighth place in the number of members per agent day devoted to club work in Oregon nine counties were included in the first quartile and eight in the fourth. For Michigan thirteen counties were included in the first and fourth quartiles.

Hypotheses seven through nine were tested using two forms of t tests. In the case of two samples $t = \frac{\overline{X}_1 - \overline{X}_2}{\sigma_{dm}}$ was used where $\overline{X}_1$ = mean of sample one, $\overline{X}_2$ = mean of sample two and σ_{dm} = the standard error of difference between uncorrelated means. When testing a sample and a population, $t = \frac{\sqrt{N}(\overline{X} - \mu)}{S}$ was used where N = number of cases in the sample; S = standard deviation of the sample; $\overline{X}$ = mean of the sample; and μ = mean of the population. With two samples degrees of freedom were determined with the formula $N_1 + N_2 - 2 = df$. For the sample and population N - 1 was used to determine degrees of freedom.

To test the stated hypothesis only the first and fourth quartiles needed to be tested. However, to obtain more complete information and to enable including the entire state in any conclusions, t tests were run between the individual samples, counties with County Extension Agents (4-H), and all counties of the state. This procedure provides a means of determining if there is any significant difference between each of the six factors for counties in the first and fourth quartiles and between these counties and counties with County Extension Agent (4-H), and all counties of the state.

Throughout all of the tests a significance level of .05 was adhered to.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Data from Oregon and Michigan were analyzed in this study. Two types of tests, coefficient of correlation and *t* tests, were applied to the data from each state. Results of these tests are reported separately for each state.[1] It is not the purpose of this study to make statistical comparisons between the two states; however, similarities of results have been noted at the conclusion of of this chapter.

Michigan

Table I, page 23 gives the results of the correlations for Michigan.

Hypothesis (1) that the number of members enrolled per county is positively correlated with the number of members per agent day devoted to 4-H is supported with a positive rho of +.343.

Hypotheses (2-a,b,c,d) that number of members per agent day devoted to 4-H is positively or will show insignificant correlation with (a) average age of 4-H members, (b) average tenure of 4-H membership, (c) percentage of completion, and (d) percentage of reenrollment are supported since no significant correlations were found between number of members per agent day devoted to 4-H and any of the other items.

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[1] Mean values, with *t* scores, are reported in Tables V and VI, Appendix A.

TABLE I

Coefficient of Correlation Between Certain Vitality Factors for all Counties of Michigan

Factors	Rho*	Significant
Number of Members per Agent Day Devoted to 4-H		
Number of 4-H Members Enrolled per County	+.343	Yes
Average Age of 4-H Members	+.003	no
Average Tenure of 4-H Membership	-.101	no
Percentage of Completion	-.151	no
Percentage of Reenrollment	+.054	no
Number of Members Enrolled per County		
Average Age of 4-H Members	+.230	yes
Average Tenure of 4-H Membership	+.103	no
Percentage of Completion	-.208	no
Percentage of Reenrollment	+.093	no
Average Age of 4-H Members		
Average Tenure of 4-H Membership	+.698	yes
Percentage of Completion	-.216	no
Percentage of Reenrollment	+.384	yes
Average Tenure of 4-H Membership		
Percentage of Completion	-.094	no
Percentage of Reenrollment	+.637	yes
Percentage of Completion		
Percentage of Reenrollment	-.326	yes

*A rho of $\pm$0.227 or larger indicates significance at 5% level.[2]

[2]Wert, op. cit., Table IX, p. 424.

The study revealed significant positive correlation between number of members enrolled per county and average age of 4-H members. No significant correlation was found between number of members enrolled per county, average tenure of 4-H membership, percentage of reenrollment, or percentage of completion. Therefore, hypotheses (3-a,b,c,d) that number of members enrolled per county is positively correlated or will show insignificant correlation with (a) average age of 4-H members, (b) average tenure of 4-H membership, (c) percentage of completion, and (d) percentage of reenrollment are supported.

Average age of 4-H members was significantly correlated with average tenure of 4-H membership and with percentage of reenrollment. It was not significantly correlated with percentage of completion, but what correlation there was gave indications of a negative tendancy. The hypotheses (4a and 4c) that average age of 4-H members is correlated with average tenure of 4-H membership, and percentage of reenrollment are supported. The hypothesis (4b) that average age of 4-H members is correlated with percentage of completion is rejected.

No significant correlation was found between average tenure of 4-H membership and percentage of completion, making it impossible to accept the hypothesis (5a) that average tenure of 4-H membership is correlated with percentage of completion. A high degree of correlation was found between average tenure of 4-H membership and percentage of reenrollment supporting the hypothesis (5b) that average tenure of 4-H membership is correlated with percentage of reenrollment.

A significant negative correlation was found between percentage of completion and percentage of reenrollment. This sub-

stantiated the hypothesis (6) that percentage of completion is correlated with percentage of reenrollment.

Differences in Mean Values of Certain Vitality Factors Between First and Fourth Quartile

Those counties with one or more agents designated as County Extension Agents (4-H) were arranged in rank order according to the number of members per agent day devoted to 4-H club work. From this ranking counties constituting the first and fourth quartiles were selected as samples one and two. With data from these counties t tests were run to determine if there were differences in the vitality factors based upon number of members per agent day devoted to 4-H.

Throughout the Michigan data the size sample was $N = 13$ requiring a t of ± 2.06 or larger for two samples and ± 2.18 or larger for sample and population to be significantly different at the 5% level using a two tailed test.[3]

Hypotheses seven and eight include the wording, "when counties with one or more agents designated as County Extension Agents (4-H) are divided into quartiles by number of members per agent day devoted to 4-H...". In the discussion to follow, each hypothesis is referred to by number and the above wording assumed rather than repeated. Future references to first and fourth quartile identify that group of counties selected from the rank ordering of all counties with one or more agents designated as County Extension Agents (4-H) according to number of members per agent day devoted to 4-H club work.

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[3]Wert, op. cit., Table VI, p. 418.

Mean Number of Members Enrolled
per County

First Quartile.....1,655.85
Fourth Quartile..... 620.38
Counties with Agent (4-H).....1,156.37
All Counties..... 890.89

Values for t of 57.85 between the first and fourth quartiles, 28.88 between first quartile and counties with County Extension Agents (4-H), and 44.24 between first quartile and all counties indicated a significant difference between samples and between the samples and populations. A t of -54.07 was obtained between the fourth quartile and all counties. The hypothesis (7a) that ..... there are significant differences in the number of members enrolled per county is supported.

Mean Number of Members per Agent
Day Devoted to 4-H

First Quartile..... 5.00
Fourth Quartile..... 2.035
Counties with Agent (4-H)..... 3.54
All Counties..... 3.55

The difference between first and fourth quartiles produced t of over 150. Similar results were obtained when comparisons were made with counties having County Extension Agents (4-H) and all counties. In all instances the first quartile produced positive values for t and the fourth quartile negative values.

The hypothesis (7b), that .... there are significant differences in the number of members per agent day devoted to 4-H is supported.

Mean Average Age of 4-H Members

First Quartile..... 12.21
Fourth Quartile..... 12.26
Counties with Agent (4-H)..... 12.38
All Counties..... 12.32

The hypothesis (8a), that ..... there are no significant differences in average age of 4-H members must be rejected. In all tests a significant negative t was secured. Between first and fourth quartiles t was -6.57. First quartile and counties with County Extension Agents (4-H) produced a t of -42.8, while all counties had t of -27.50. When the fourth quartile was used as a sample and all counties as the population t was -9.19. This result suggests that although the higher average age of 4-H members tends to appear in those counties with the lower number of members per agent day devoted to 4-H this is not necessarily true. The fourth quartile, having the least members per agent day devoted to 4-H, also produced a negative t. This affirms the earlier finding that a significant correlation does not exist between members per agent day devoted to 4-H and average age of 4-H members.

Mean Average Tenure of 4-H Membership

First Quartile	2.40
Fourth Quartile	2.58
Counties with Agent (4-H)	2.59
All Counties	2.54

When the first quartile was compared to the fourth quartile a t of -19.14 was obtained, indicating a significant difference in favor of the lower member per agent day situation. This is further borne out when the fourth quartile was tested against all counties and a t of 6.545 obtained. Using the first quartile against counties with County Extension Agents (4-H) and all counties negative t's of -22.30 and -19.38 respectively were obtained, indicating a significant loss in average member tenure in counties with a large number of members per agent day devoted to 4-H. No significant difference was found when the fourth quartile was compared with counties having

County Extension Agents (4-H) (t = 0.1636). Even with this one instance of no difference, previous evidence is such that hypothesis (8b) that ..... there are no significant differences in average tenure of 4-H membership, must be rejected.

Mean Percentage of Completion

First Quartile	89.09
Fourth Quartile	91.97
Counties with Agents (4-H)	90.46
All Counties	90.18

Negative t's of -7.51, -11.57, and -9.218 were obtained when the first quartile was compared with (1) the fourth quartile, (2) counties with County Extension Agents (4-H), and (3) all counties. Values for t of 30.74 and 25.93 were obtained when the fourth quartile was compared with counties having County Extension Agents (4-H) and with all counties. This evidence justifies rejection of hypothesis (8c) that ..... there are no significant differences in percentage of completion, and indicates that in those counties with fewer members per agent day devoted to 4-H the expected percentage of completion would be higher.

Mean Percentage of Reenrollment

First Quartile	66.95
Fourth Quartile	67.55
Counties with Agents (4-H)	70.05
All Counties	67.84

A statistically significant difference was found between the first quartile and the fourth quartile (t = -2.47). A t of -11.35 resulted from the first quartile and counties with County Extension Agents (4-H), while the first quartile and all counties produced a t of -3.25. This required rejection of hypothesis (8d) that ..... there are no significant differences in percentage of

reenrollment. The fourth quartile produced no significant difference between the sample and all counties of the state ($t = 0.98$). Compared with counties having County Extension Agents (4-H) a t of -7.5 was obtained.

With the results from all five tests it was necessary to reject the hypothesis of no difference. But with first and fourth quartiles producing negative t's it was not possible to predict a trend for percentage reenrollment based upon number of members per agent day devoted to 4-H. This is further evidence to substantiate the earlier finding of no significant correlation between number of members per agent day devoted to 4-H and percentage of reenrollment.

Exposure Factor

A decisively significant difference was found between the exposure factors of the first and fourth quartiles.

Table 2

Exposure Factors for the First and Fourth Quartile

	Number of Members	Average Tenure	Exposure Factor
First Quartile	1,655.85	2.40	3960.04
Fourth Quartile	620.38	2.58	1600.58

Such a significant difference dictates acceptance of hypothesis (9) that when counties with one or more agents designated as County Extension Agents (4-H) are divided into quartiles by number of members per agent day devoted to 4-H those counties in the first quartile have a significantly higher exposure factor than those in the fourth quartile.

Oregon

The same tests were applied to the Oregon data as to Michigan. The results of the correlations for Oregon are shown in Table 3, page 31.

A highly significant correlation (+.706) was obtained between number of members enrolled per county and number of members per agent day devoted to 4-H. Such a high correlation strongly supports hypothesis (1) that number of members enrolled per county is positively correlated with the number of members per agent day devoted to 4-H.

Number of members per agent day devoted to 4-H was found to be negatively correlated with average tenure of 4-H membership and percentage of reenrollment. Thus, rejection of hypotheses (2b and 2d) that number of members per agent day devoted to 4-H is positively correlated, or will show insignificant correlation with (b) average tenure of 4-H membership and (d) percentage of reenrollment was required. No significant correlation, either positive or negative, was found for 2a or 2c providing evidence for acceptance of the hypotheses that number of members per agent day devoted to 4-H is positively correlated or will show insignificant correlation with (a) average age of 4-H members, or (c) percentage of completion.

TABLE 3

Coefficient of Correlation Between Certain Vitality Factors for all Counties of Oregon

Factors	Rho*	Significant
Number of Members per Agent Day Devoted to 4-H		
Number of Members Enrolled per County	+.706	yes
Average Age of 4-H Members	-.331	no
Average Tenure of 4-H Membership	-.577	yes
Percentage of Completion	+.213	no
Percentage of Reenrollment	-.467	yes
Number of Members Enrolled per County		
Average Age of 4-H Members	-.288	no
Average Tenure of 4-H Membership	-.638	yes
Percentage of Completion	+.018	no
Percentage of Reenrollment	-.584	yes
Average Age of 4-H Members		
Average Tenure of 4-H Membership	-.015	no
Percentage of Completion	-.375	yes
Percentage of Reenrollment	+.011	no
Average Tenure of 4-H Membership		
Percentage of Completion	+.100	no
Percentage of Reenrollment	+.821	yes
Percentage of Completion		
Percentage of Reenrollment	-.022	no

*Rho of $\pm$.334 or larger is necessary to be significant at 5% level.[3]

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[3]Wert, op. cit., Table IX, p. 424.

Hypotheses 3b and 3d, number of members enrolled per county is positively correlated or will show insignificant correlations with (b) average tenure of 4-H membership and (d) percentage of reenrollment, must be rejected since highly significant correlations were found. Hypotheses 3a and 3c, number of members enrolled per county is positively correlated or will show insignificant correlation with (a) average age of 4-H members and (c) percentage of completion, are supported as insignificant correlations were found in both cases.

Average age of 4-H members failed to produce significant correlation with percentage of reenrollment or average tenure of 4-H membership causing rejection of hypotheses (4a and 4c) that average age of 4-H members is correlated with (a) average tenure of 4-H membership or (c) percentage of reenrollment. A significant correlation, -.375, was found between average age of 4-H members and percentage of completion. This confirms the hypothesis (4b) that average age of 4-H members is correlated with percentage of completion.

Hypothesis (5a) that average tenure of 4-H membership is correlated with percentage of completion, was rejected due to insignificant correlation.

Average tenure of 4-H membership is correlated with percentage of reenrollment producing a rho of +.821 and acceptance of hypothesis (5b).

The hypothesis (6), percentage of completion is correlated with percentage of reenrollment, is rejected since no significant correlation was obtained.

Differences in Mean Values of Certain Vitality Factors Between First and Fourth Quartiles

The method of sample procurement and testing procedures for Oregon data was identical to those described on page 25.

For Oregon data the value of t, to be significant at the 5% level, was ± 2.13 or larger for two samples and ± 2.36 or larger for a sample and the population.

Mean Number of Members Enrolled per County

First Quartile	1,393.1
Fourth Quartile	546.0
Counties with Agent (4-H)	980.61
All Counties	860.4

Significant differences, t's of 37.00, 19.99, and 25.82, were found in the number of members enrolled per county when comparing first quartile to fourth quartile, counties with County Extension Agents (4-H), and all counties. Such evidence supports the hypothesis (7a) that <u>.... there are significant differences in the number of members enrolled per county</u>.

Mean Number of Members per Agent Day Devoted to 4-H

First Quartile	3.01
Fourth Quartile	1.44
Counties with Agent (4-H)	2.18
All Counties	3.55

Hypothesis (7b) that <u>there are significant differences in the number of members per agent day devoted to 4-H</u> was statistically supported by t's of 43.8, 34.87, and 39.07 when first quartile was compared to fourth quartile, counties with County Extension Agents (4-H), and all counties.

Mean Average Age of 4-H Members

First Quartile	11.82
Fourth Quartile	12.37
Counties with Agent (4-H)	12.83
All Counties	12.15

A qualified rejection of the hypothesis (8a) .... there are no significant differences in average age of 4-H members was necessary. Comparison of first and fourth quartiles produced a t of -22.17. When first quartile was compared to counties with County Extension Agent (4-H) and all counties even greater indications of differences (-92.66 and -30.28) were obtained. In rejecting the hypothesis a plausible inference would be that average age will increase as number of members per day devoted to 4-H increases. This is not a correct inference for two reasons. First, no significant correlation either positive or negative was obtained in earlier tests between number of members per agent day devoted to 4-H and average age of 4-H members. Second, when fourth quartile is used as a sample and compared to counties with County Extension Agents (4-H) a t of -20.5 is obtained.

Mean Average Tenure of 4-H Membership

First Quartile	2.32
Fourth Quartile	2.66
Counties with Agent (4-H)	2.54
All Counties	2.60

Rejection of hypothesis (8b) that .... there are no significant differences in average tenure of 4-H membership, is required since t's of -22.28, -14.28, and -18.18 were obtained when comparing the first quartile with the fourth quartile, counties with County Extension Agents (4-H) and all counties. A t of 5.14 for the fourth quartile and all counties further substantiates the earlier finding

of negative correlation between number of members per agent day devoted to 4-H and average tenure of 4-H membership.

Mean Percentage of Completion

First Quartile	85.5
Fourth Quartile	83.0
Counties with Agent (4-H)	80.4
All Counties	80.68

Hypothesis (8c) that .... there are no significant differences in percentage of completion must be rejected. Significant t's were found using both first and fourth quartiles as samples. Since all t's were positive it was impossible to make inferences as to direction of the differences.

Mean Percentage of Reenrollment

First Quartile	60.9
Fourth Quartile	73.3
Counties with Agent (4-H)	70.54
All Counties	71.28

Earlier tests showing negative correlation between number of members per agent day devoted to 4-H and percentage of reenrollment were confirmed by the t tests using first and fourth quartiles against each other and also the populations. First quartile produced negative t's and the fourth quartile positive. Such evidence implies that the hypothesis (8d) that .... there are no significant differences in percentage of reenrollment be rejected.

Exposure Factor

A decisively significant difference was found between the exposure factors of the first and fourth quartiles.

TABLE 4

Exposure Factors for the First and Fourth Quartiles

	Number of Members	Average Tenure	Exposure Factor
First Quartile	1,393.1	2.32	3231.99
Fourth Quartile	546.0	2.66	1552.36

Therefore, the hypothesis (9) when counties with one or more agents designated as County Extension Agents (4-H) are divided into quartiles by number of members per agent day devoted to 4-H those counties in the first quartile have a significantly higher exposure factor than those in the fourth quartile is supported.

Similarity of Findings

Both Michigan and Oregon showed a high degree correlation between the number of members enrolled per county and the number of members per agent day devoted to 4-H.

Percentage of reenrollment was found to correlate with average tenure of 4-H membership in both states. Even greater similarities (see Tables V and VI in Appendix A) were found in the t test results where all findings were similar except for:

1. Average age of 4-H members. Oregon's fourth quartile is significantly older than rest of state while Michigan's is significantly younger.
2. Percentage of completion. Oregon's first quartile was significantly larger than rest of state while Michigan's was lower.

3. Percentage of reenrollment. Oregon's fourth quartile was significantly larger than rest of the state while Michigan's showed no significant difference.

In neither state was there a significant correlation between:

1. Members per agent day devoted to 4-H and average age of 4-H members.
2. Members per agent day devoted to 4-H and percentage of completion.
3. Number of members enrolled per county and percentage of completion.
4. Average tenure of 4-H membership and percentage of completion.

Application of Findings to Hypothetical County

The study indicates a significant loss in average age, average tenure, percentage completion, and percentage reenrollment. However, when these are considered in combination with number of members enrolled and number of members per agent day devoted to 4-H the results raise doubts as to the true significance of such losses.

For example, Michigan counties in the first quartile average five members for every agent day devoted to 4-H. These members will stay 2.4 years, 89.09% will complete and 66.95% will reenroll. In the fourth quartile for every agent day devoted to 4-H only 2.04 members will belong to 4-H. They will stay 0.18 of a year longer, 1.88% more will complete, and 0.6 of 1% more will reenroll.

Using 280 working days as a hypothetical year, the first quartile counties will have 1,400 members enrolled per agent year devoted to 4-H. Of these, 1,247.26 will complete and 835.04 will reenroll. For the same amount of extension agent time, fourth quartile counties will have 469.8 members of whom 432.08 will complete and 291.87 will reenroll.

CHAPTER V

SUMMARY AND CONCLUSIONS

This an exploratory study to determine if certain vitality factors in county 4-H programs are related to the number of members enrolled per county.

Initially several basic assertions were made.

1. That statistical measurements, in an educational program, are only indicators of progress.
2. While these six vitality factors were chosen for study it is in no way implied that these are the only factors that might have been used.
3. No attempt is made in this study to define or identify quality of 4-H work done and the factors chosen are not to be considered as direct measures of quality.

Data for the study were secured from the 1958 and 1959 annual statistical reports for each county extension office in Michigan and Oregon. These two states were chosen because of (1) the dissimilarity in local 4-H club organizational procedures, (2) the difference in density of population and source of income, and (3) the author's participation in the Institute for Extension Personnel Development at Michigan State University and personal interest in Oregon where he is employed as a County Extension Agent (4-H).

Summary of Findings

In both states there was a very positive correlation between number of members enrolled per county and number of members per agent day devoted to 4-H. A summary of the correlations between all six vitality factors is shown in Tables 5 and 6, pages 41 and 42.

From a statistical point of view there was a very significant difference in every factor when comparing the first quartile against the fourth quartile, those counties with County Extension Agents (4-H), or all counties of the state. The results were principally the same for both states. Oregon showed a significant difference in percentage completion in favor of the larger enrollment and greater members per agent day devoted to 4-H, while Michigan showed a significantly lower percentage completion in counties with large enrollment and greater number of members per agent day devoted to 4-H.

Table 5

Summary of Correlation Between
Vitality Factors for Oregon

Members per Agent Day	Number of Members	Average Age	Average Tenure	Percentage Completion	Percentage Reenrollment	
...	+	0	-	0	-	Members per Agent Day
+	...	0	-	0	-	Number of Members
0	0	...	0	-	0	Average Age
-	-	0	...	0	+	Average Tenure
0	0	-	0	...	0	Percentage completion
-	-	0	+	0	...	Percentage Reenrollment

Key

\+ Significant positive correlation

\- Significant negative correlation

0 No significant correlation

Table 6

Summary of Correlation Between Vitality Factors for Michigan

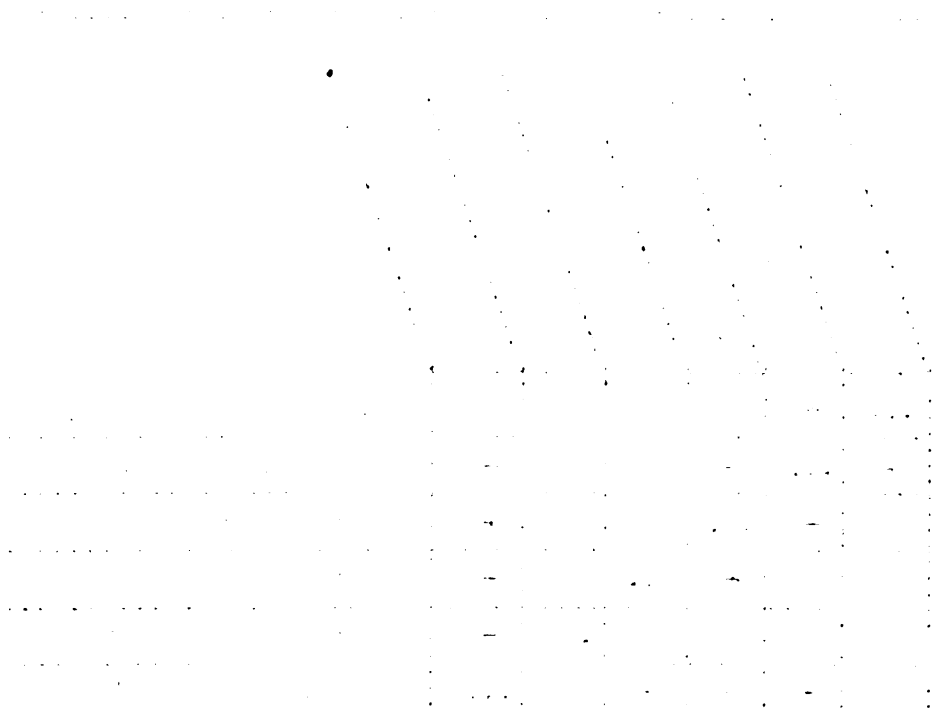
Members per Agent Day	Number of Members	Average Age	Average Tenure	Percentage Completion	Percentage Reenrollment	
...	+	0	0	0	0	Members per Agent Day
+	...	+	0	0	0	Number of Members
0	+	...	+	0	+	Average Age
0	0	+	...	0	+	Average Tenure
0	0	0	0	...	-	Percentage Completion
0	0	+	+	-	...	Percentage Reenrollment

Key

\+ Significant positive correlation

\- Significant negative correlation

0 No significant correlation



The comparison of means of first and fourth quartiles, when counties having one or more agents designated as County Extension Agent (4-H) were ranked according to the number of members per agent day, and of these quartiles with counties having agents (4-H) and all counties can be summarized as follows:

Oregon

Number of members enrolled per county:

1. 1st quartile has significantly more members enrolled per county than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly less members enrolled per county than all counties.

Number of members per agent day devoted to 4-H:

1. 1st quartile has significantly more members per agent day devoted to 4-H than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly less members per agent day devoted to 4-H than all counties.

Average age of 4-H members:

1. 1st quartile has significantly younger members than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile members are significantly older than in all counties.

Average tenure of 4-H membership:

1. 1st quartile has significantly less tenure than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly longer tenure than all counties.

Percent of completions:

1. 1st quartile has significantly larger percentage completing than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly larger percentage completing than all counties.

Percent of reenrollment:

1. 1st quartile has significantly smaller percentage reenrollment

than the 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly larger percentage reenrollment than for all counties.

Michigan

Number of members enrolled per county:

1. 1st quartile has significantly more members enrolled per county than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly less members enrolled per county than all counties.

Number of members per agent day devoted to 4-H:

1. 1st quartile has significantly more members per agent day devoted to 4-H than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly less members per agent day devoted to 4-H than all counties.

Average age of 4-H members:

1. 1st quartile has significantly younger members than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile members are significantly younger than all counties.

Average Tenure of 4-H membership:

1. 1st quartile has significantly less tenure than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly longer tenure than all counties.

Percent of completion:

1. 1st quartile has significantly smaller percentage completing than 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile has significantly larger percentage completing than all counties.

Percent of reenrollment:

1. 1st quartile has significantly smaller percentage reenrollment than the 4th quartile, counties with County Extension Agents (4-H), or all counties.
2. 4th quartile shows no significant difference in percentage reenrollment from all counties.

Conclusions

From a statistical standpoint the major hypothesis that as the number of members per agent day devoted to 4-H increases, there is a corresponding increase in the total number of club members enrolled can be supported. But, that portion which states there is no significant shift or loss in the other four vitality factors (i.e. average age of 4-H members, average tenure of 4-H membership, percentage of completion, and percentage of reenrollment) must be rejected.

However, when all six factors are considered as they interact upon one another it appears that counties with larger enrollment per county and with more members per agent day devoted to 4-H have a larger number of members complete and reenroll than do counties with smaller enrollment and fewer members per agent day devoted to 4-H.

Although extenuating circumstances will be encountered in every county situation, the results of this study indicate that the number of members enrolled per county and number of members per agent day devoted to 4-H can be increased without serious sacrifice of average age of members, average tenure of members, percentage completion or percentage reenrollment.

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APPENDIX A

TABLES

TABLE I

COMPUTED DATA FOR MICHIGAN COUNTIES

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
10.50	210	11.87	2.00	89.05	44.1
8.00	200	11.88	2.38	94.00	60.5
5.85	1,105	13.04	2.97	88.15	74.7
5.70	1,573	12.21	2.15	90.53	66.3
5.66	317	12.64	2.12	86.76	61.5
5.54	537	13.06	3.18	77.66	126.8*
5.46	2,891	12.02	1.78	84.02	35.5
5.27	1,053	11.84	2.06	93.83	77.2
5.12	1,665	12.52	2.78	84.57	82.4
5.09	1,701	11.98	2.42	94.24	63.0
5.09	1,450	12.39	2.53	89.52	76.5
4.90	1,329	12.30	2.53	98.20	64.9
4.84	1,679	11.78	2.37	94.11	62.4
4.80	734	12.11	2.40	83.38	66.3
4.74	3,256	12.37	2.25	82.22	59.2
4.71	1,221	12.69	3.04	91.00	66.1
4.70	1,562	12.18	2.42	90.21	66.7
4.66	1,412	12.40	2.71	82.37	83.8
4.62	965	11.90	1.98	88.92	60.5
4.50	2,239	13.14	3.10	90.05	92.4
4.49	1,207	12.60	3.21	92.47	77.0

*Investigation indicates correct based on available data.

TABLE I, Continued

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
4.43	1,276	12.52	3.15	89.11	83.8
4.28	419	12.56	2.83	96.50	73.0
4.27	105	11.65	2.07	95.90	64.0
4.18	1,462	12.73	2.95	93.85	72.5
4.09	1,197	13.30	2.97	81.96	76.2
4.08	1,683	12.27	2.24	83.25	70.7
4.28	1.442	12.36	2.72	91.13	70.4
3.99	1,098	12.35	3.05	93.27	76.3
3.89	105	11.35	2.07	96.20	50.5
3.70	1,296	12.38	2.72	77.56	75.9
3.69	1,092	12.83	2.50	91.21	52.6
3.68	873	12.85	3.05	95.31	66.6
3.63	908	11.59	2.04	95.16	55.4
3.62½	2.101	11.90	2.29	88.34	70.8
3.53	438	12.23	2.77	85.16	79.5
3.46	1,093	12.74	3.23	86.56	77.5
3.28	272	12.60	2.92	79.05	92.4
3.27	858	13.13	2.30	91.85	72.1
3.22	1,246	12.62	2.31	98.32	46.3
3.18	828	12.40	2.72	87.57	69.6
3.17	1,089	12.64	2.82	85.40	71.0
3.15	984	12.55	2.78	90.45	74.2

TABLE I, Continued

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
3.14	937	11.75	2.64	91.89	86.9
3.07	1,096	12.70	3.16	97.08	80.2
3.00	186	11.77	1.85	93.55	62.9
2.95	902	11.90	2.15	96.57	51.4
2.95	1,258	13.64	3.18	88.40	70.7
2.94	803	12.44	2.69	94.15	75.6
2.91	784	12.47	3.03	94.90	65.9
2.87	1,054	12.10	2.59	88.05	69.0
2.86	266	12.16	2.41	85.34	64.0
2.75	302	11.85	2.33	88.75	59.8
2.70	488	12.62	2.58	95.29	63.4
2.64	356	12.01	1.99	83.15	65.7
2.60	745	12.53	2.50	91.01	68.7
2.58	727	12.36	2.58	92.71	73.4
2.52	307	12.08	1.88	92.19	49.3
2.51	351	11.69	2.05	94.31	54.6
2.45	326	13.04	2.41	87.12	54.1
2.39	993	11.90	2.51	85.30	83.3
2.30	737	12.05	2.45	89.83	64.8
2.29	406	12.28	2.57	94.34	61.3
2.27	900	13.03	3.15	92.12	75.4
2.26	351	12.05	2.18	78.64	62.6

TABLE I, Continued

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
2.20	88	11.72	2.22	96.60	62.2
2.12	268	12.60	3.07	89.18	58.2
2.02	663	12.46	2.66	89.75	71.6
1.96	536	12.53	2.58	94.22	73.1
1.92	594	12.15	2.37	89.74	61.6
1.88	197	11.61	2.38	91.38	60.4
1.83	423	12.37	2.81	98.11	61.0
1.80	907	12.28	2.30	89.42	56.0
1.80	300	12.01	2.40	91.01	71.5
1.72	505	12.31	2.80	96.04	63.2
1.62	223	12.11	1.98	96.42	54.8
1.61	269	12.06	2.82	92.57	95.7
1.59	164	12.11	2.89	87.20	53.5
1.54	460	12.25	2.52	91.53	44.4

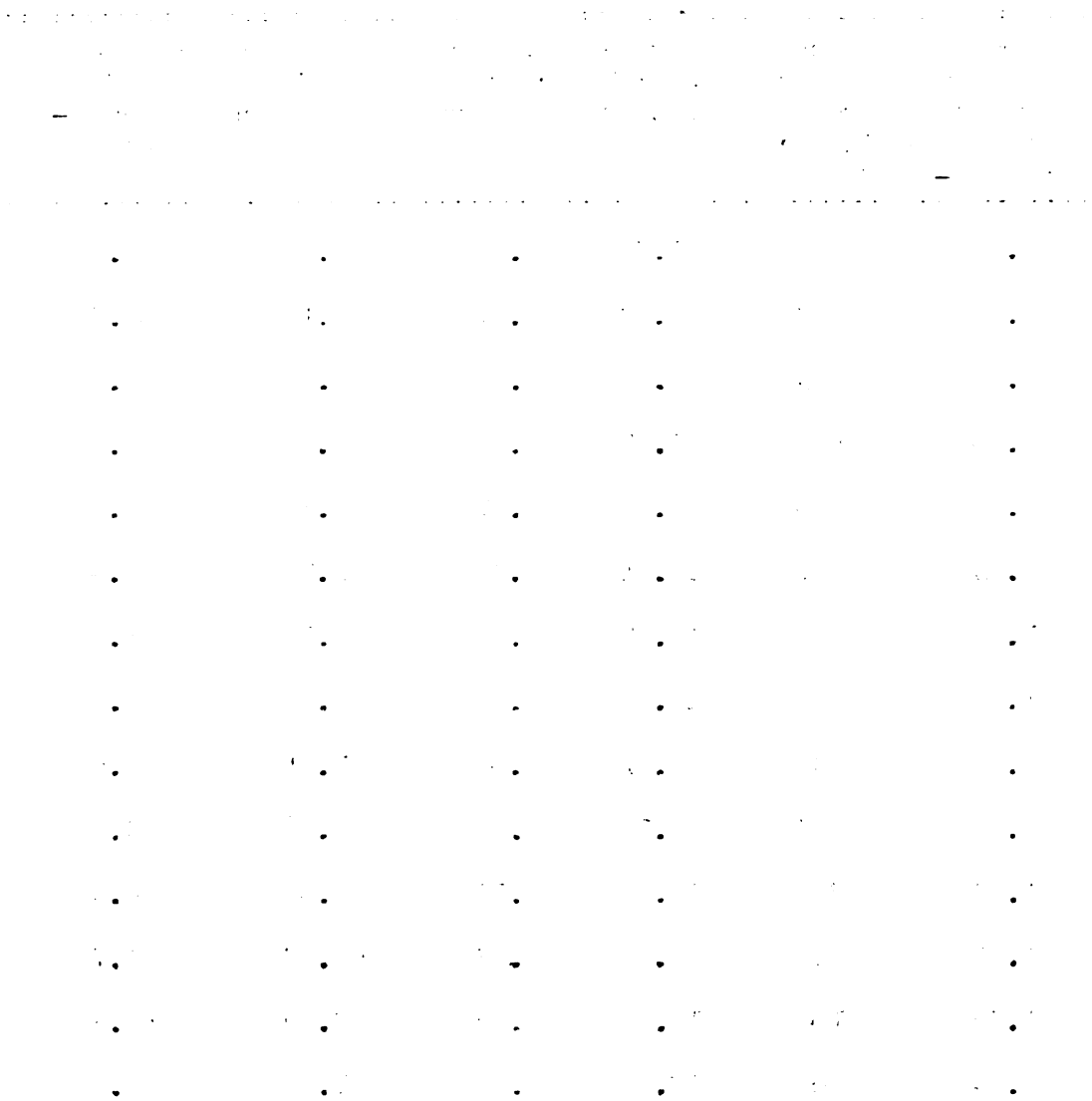


TABLE II

COMPUTED DATA FOR OREGON COUNTIES

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
4.05	2,266	11.73	2.29	83.05	68.4
3.64	902	11.83	2.61	91.01	72.6
3.63	1,867	11.54	2.12	92.12	56.0
2.89	1,346	11.97	1.95	84.62	45.0
2.79	872	11.39	2.63	90.94	54.1
2.75	1,661	12.39	2.31	80.07	65.1
2.62	1,410	11.92	2.82	82.90	72.1
2.52	825	11.72	2.45	89.69	66.2
2.52	2,089	11.88	1.69	75.01	48.5
2.50	811	12.52	2.29	88.28	66.4
2.40	764	11.75	2.33	89.00	78.1
2.39	2,065	11.52	2.23	59.97	60.5
2.19	304	11.64	2.75	79.27	73.5
2.18	292	12.58	2.74	85.61	78.9
2.15	1,627	12.76	2.06	69.40	57.1
2.13	555	12.65	2.82	87.02	72.6
2.09	651	13.41	2.87	90.01	67.3
2.01	978	13.29	2.46½	67.28	81.0
1.99	620	11.54	3.71	81.61	103.7*
1.94	790	11.71	2.41	82.02	61.2

*Investigation indicates correct based on available data.

TABLE II, Continued

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
1.89	244	13.43	2.49	77.86	75.8
1.87	584	12.34	2.83	81.33	78.6
1.85	1,109	11.08	2.72	84.94	79.0
1.83	610	11.26	2.62	89.50	81.5
1.76	498	11.71	2.84	74.09	94.3
1.74	1,131	11.67	2.66	92.74	70.9
1.70	548	11.69	2.37	83.57	69.8
1.68	590	12.46	2.46	84.23	69.0
1.47	880	13.09	2.69	83.75	72.0
1.45	509	12.42	2.38	78.78	70.9
1.38	355	12.75	2.43	88.16	73.6
1.30	314	11.83	2.91	73.50	84.5
1.29	472	12.69	2.93	82.41	73.5
1.27	700	12.05	2.95	89.71	73.6
1.17	267	12.21	3.25	81.27	90.9
0.99	201	11.87	3.28	93.53	77.1
0.96	129	13.12	2.85	75.19	74.5

TABLE III

Data for Michigan Counties in 1st. & 4th. Quartiles*

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
		1st. Quartile			
5.70	1,573	12.21	2.15	90.53	66.3
5.45	2,891	12.02	1.78	84.02	35.5
5.27	1,053	11.84	2.06	93.82	77.2
5.12	1,665	12.52	2.78	84.57	82.4
5.09	1,701	11.98	2.24	94.24	63.0
5.09	1,450	12.39	2.53	89.52	76.5
4.90	1,329	12.30	2.53	98.20	64.9
4.84	1,679	11.78	2.37	94.11	62.4
4.80	734	12.11	2.40	83.38	66.3
4.74	3,256	12.37	2.25	82.22	59.2
4.71	1,221	12.69	3.04	91.00	66.1
4.70	1,562	12.18	2.42	90.21	66.7
4.66	1,412	12.40	2.71	82.37	83.8
		4th. Quartile			
2.59	727	12.36	2.58	92.71	73.4
2.51	351	11.69	2.05	94.31	54.6
2.39	993	11.90	2.51	85.30	83.3
2.30	737	12.05	2.45	89.83	64.8
2.27	900	13.03	3.15	92.12	75.4

TABLE III, Continued

Data for Michigan Counties in 1st. & 4th. Quartiles

Number of Members Per Agent Day Devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
4th. Quartile, Continued					
2.02	663	12.46	2.66	89.75	71.6
1.96	536	12.53	2.58	94.22	73.1
1.92	594	12.15	2.37	89.74	61.6
1.83	423	12.37	2.81	98.11	61.0
1.80	907	12.28	2.30	89.42	56.0
1.72	505	12.31	2.80	96.04	68.2
1.61	269	12.06	2.82	92.57	95.7
1.54	460	12.25	2.52	91.53	44.4

* (a) based upon number of members per agent day devoted to 4-H Club work.

(b) only counties with one or more agents designated as "County Extension Agent 4-H" are included.

TABLE IV

Data for Oregon Counties in 1st. & 4th Quartiles*

Number of Members Per Agent Day devoted to 4-H	Number of Members Enrolled in the County	Average Age of Members	Average Tenure of Members	Percentage of Completion	Percentage of Reenrollment
		1st. Quartile			
4.05	2,266	11.73	2.29	83.05	68.4
3.64	902	11.83	2.61	91.01	72.6
3.63	1,167	11.54	2.12	92.12	56.0
2.89	1,346	11.97	1.95	84.62	45.0
2.79	872	11.39	2.63	90.94	54.1
2.75	1,661	12.39	2.31	80.07	65.1
2.62	1,410	11.92	2.82	82.90	72.0
2.52	825	11.72	2.45	89.69	66.2
2.52	2,089	11.88	1.69	75.01	48.5
		4th. Quartile			
1.70	548	11.69	2.37	83.57	69.8
1.68	590	12.46	2.64	84.23	69.0
1.47	880	13.09	2.69	83.75	72.0
1.45	509	12.42	2.38	78.78	70.9
1.38	355	12.75	2.43	88.16	73.5
1.30	314	11.83	2.91	73.50	84.5
1.29	472	12.69	2.93	82.41	73.5
1.27	700	12.05	2.95	89.71	73.6

* (a) based upon number of members per agent day devoted to 4-H Club work. (b) only counties with one or more agents designated as "County Extension Agent 4-H" are included.

TABLE V

MEAN VALUES FOR MICHIGAN
(with t scores)

FOR 1st. QUARTILE, 4th. QUARTILE, COUNTIES WITH COUNTY EXTENSION AGENT (4-H), ALL COUNTIES

Type of Samples	Number of Members Per Agent - Day		Number of Members		Average Age of Members		Average Tenure of Members		Percentage of Completion		Percentage of Reenrollment	
	Mean	t	Mean	t	Mean	t	Mean	t	Mean	t	Mean	t
A	5.00		1655.85		12.21		2.40		89.09		66.95	
and		+256.03		+57.847		- 6.57		-19.14		- 7.5789		- 2.469
B	2.03		620.3		12.26		2.58		91.97		67.55	
A	5.00		1655.85		12.21		2.40		89.09		66.95	
and		+165.28		+28.889		-42.50		-22.30		-11.577		-11.35
C	3.54		1156.37		12.38		2.59		90.46		70.05	
A	5.00		1655.85		12.21		2.40		89.09		66.95	
and		+165.15		+44.24		-27.50		-19.38		- 9.218		- 3.25
D	3.55		890.89		12.32		2.54		90.18		67.84	
B	2.03		620.3		12.26		2.58		91.97		67.55	
and		-197.61		-54.0719		- 9.19		+ 6.595		+30.74		- 0.98
D	3.55		890.89		12.32		2.54		90.18		67.84	

Legend

A - First Quartile
B - Fourth Quartile
C - County Extension Agents (4-H)
D - All Counties

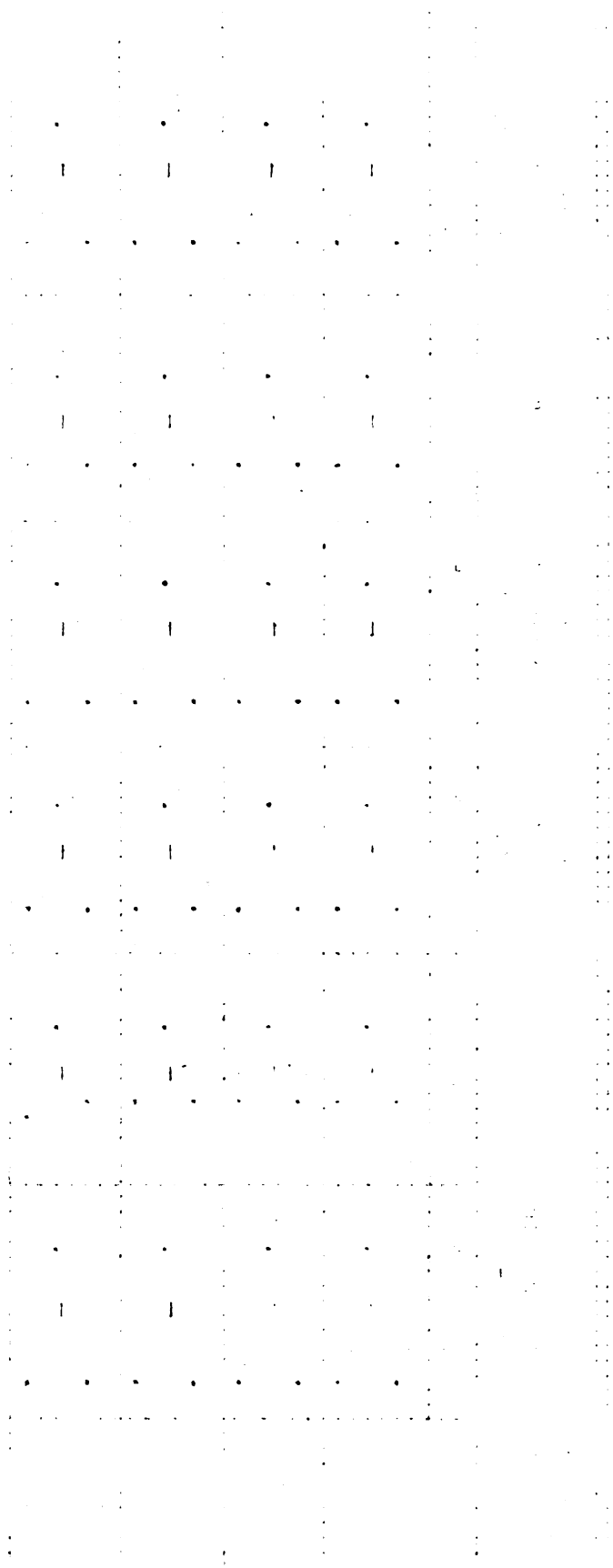


TABLE VI

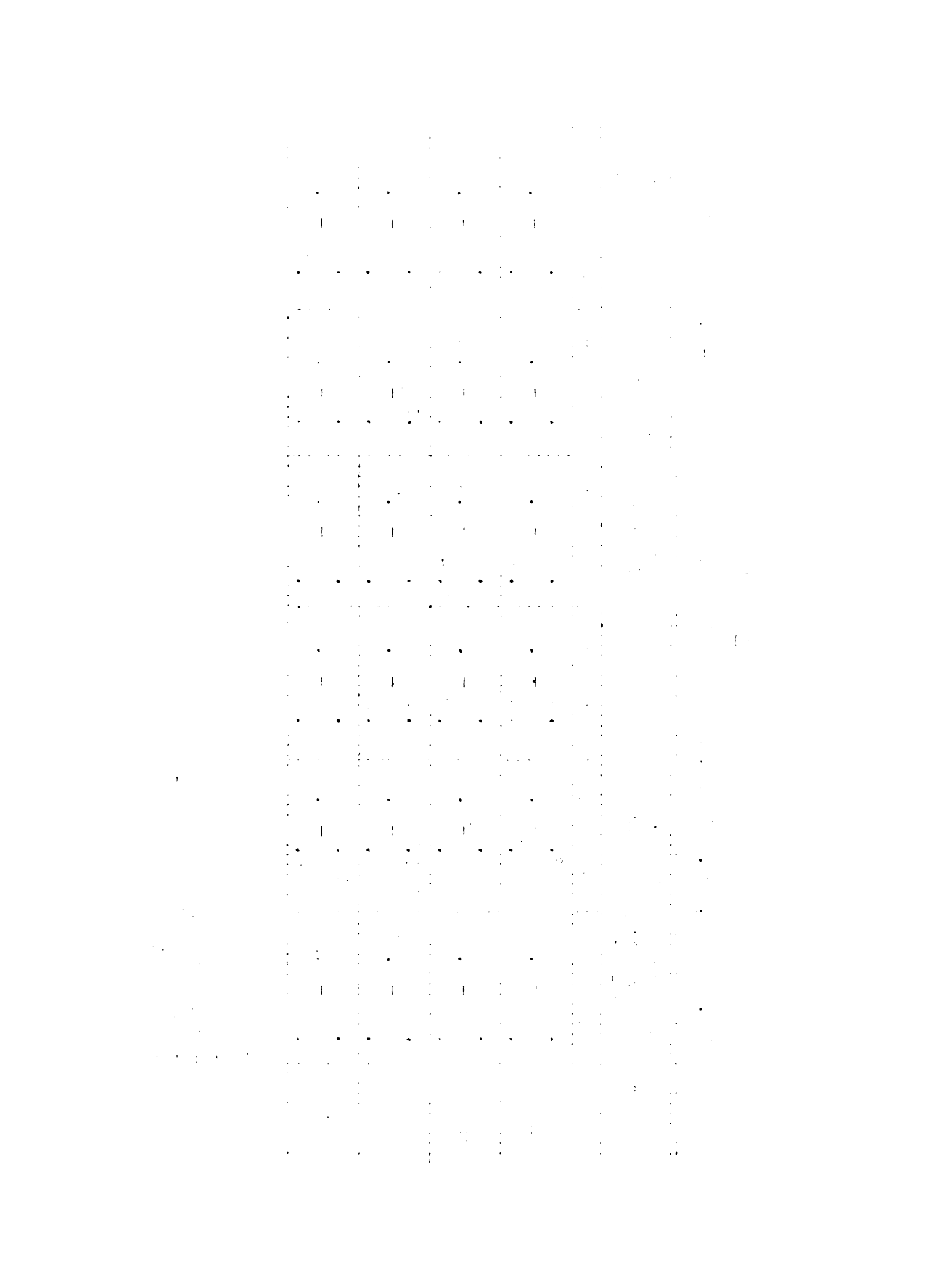
MEAN VALUES FOR OREGON
(with t scores)

FOR 1st. QUARTILE, 4th. QUARTILE, COUNTIES WITH COUNTY EXTENSION AGENT (4-H), ALL COUNTIES

Type of Samples	Number of Members Per Agent - Day		Number of Members		Average Age of Members		Average Tenure of Members		Percentage of Completion		Percentage of Reenrollment	
	Mean	t	Mean	t	Mean	t	Mean	t	Mean	t	Mean	t
A and B	3.01 1.44	+43.8	1393.1 546.0	+37.00	11.82 12.37	-22.17	2.32 2.66	-22.28	85.5 83.0	+ 7.5	60.9 73.3	-28.12
A and C	3.01 2.18	+34.87	1393.1 980.61	+19.99	11.82 12.83	-92.66	2.32 2.54	-14.28	85.5 80.4	+22.2	60.9 70.54	-24.00
A and D	3.01 2.08	+39.07	1393.1 860.4	+25.82	11.82 12.15	-30.28	2.32 2.60	-18.18	85.5 80.6	+20.97	60.9 71.28	-25.84
B and D	1.44 2.08	-23.81	546.0 860.4	-36.38	12.37 12.15	+ 9.78	2.66 2.60	+ 5.142	83.0 80.6	+ 9.049	73.3 71.28	+ 7.879

Legend

A - First Quartile
B - Fourth Quartile
C - County Extension Agents (4-H)
D - All Counties



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