

THE ROLE OF PERSONALITY FACTORS IN
STRUCTURING SMALL GROUPS

A Thesis

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TABLE OF CONTENTS

CHAPTER	PAGE
I. THE PROBLEM	1
II. HISTORICAL SURVEY	5
III. OUTLINE OF PROCEDURE	15
A. Source of Data	15
B. Materials Used	16
1. Sociometric Test	16
2. Personality Inventory	20
3. Efficiency Ratings	21
C. Testing Procedure	22
IV. ANALYSIS OF THE EXPERIMENTAL FINDINGS	
A. Introduction	24
B. Sociometric Score Classification	26
C. Guilford-Martin Personality Inventory	29
D. Personality Traits and Sociometric Classification	33
E. Mutuals and Unrelated Pairs	45
F. Personality, Efficiency and Group Structure	54
V. SUMMARY AND CONCLUSIONS	72
A. Hypothesis	72
B. Summary of Procedure	72
C. Conclusions	74

CHAPTER	PAGE
BIBLIOGRAPHY	77
APPENDIX	78

LIST OF TABLES

TABLE	PAGE
I. Comparison of Means of Overchosen, Average and Underchosen on Guilford-Martin Personality Inventory	35
II. Values of Chi-Square Obtained When Overchosen and Underchosen Distributions Compared in Thirteen Factors	43
III. Correlations of Sociometric Scores with Guilford-Martin Personality Traits . . .	46
IV. Comparison of Mean Differences of Mutual and Unrelated Pairs	50
V. Chi-Square Values of Mutual Pairs and Unrelated Pairs when Compared with Chance	52
VI. Group Rankings on Effectiveness	56
VII. Group Correlation-Coefficients on Composite G, I, S, R Trait Scores	60
VIII. Correlations of Efficiency Ratings and Sociometric Scores	64
IX. Standard Deviations of Groups on Sociometric Scores	69

CHAPTER I

THE PROBLEM

Sociometry is the study of the interrelations of individual members of a specified group. The technique consists of a questionnaire that is presented to each member of the group. In the questionnaire, the subject is asked to specify preference for associates in certain definite and real situations. From the answers, the group structure is plotted so that each individual's choices and the choices that each individual receives are depicted.

The first step in plotting the group structure is to draw up a scoring chart.¹ A convenient form is to list the subjects in alphabetical order along the top of the chart and in the same order down the side. Each choice a subject makes is recorded in the square formed by the row opposite the subject's name and the column below the name of the subject that is chosen. Choices made on each question are kept separately. By following this method, the various choices received, by whom they were given, and on what basis the choice was made, are recorded for each subject. When the

¹ The scoring charts for this study are to be found in Appendix D.

separate columns under each subject's name are totalled, one can discover to what extent each subject was chosen for each situation. The total of the columns is the total number of choices a subject receives.

The next step usually taken is to show the socio-metric findings on a target diagram. The target diagram consists of four concentric circles, the boundaries of which are statistically derived. In the innermost circle are placed the names of those subjects whose scores are significantly above chance. The next zone contains the names of those subjects whose scores are above chance. In the next are those subjects whose scores are below chance, and in the outermost zone those subjects whose scores are significantly below chance. Lines are then drawn between individuals to show source and direction of choice. The result is a graphic picture of the inter-personal structure of the group.

This ability to demonstrate graphically the inter-personal structure of social groups is of great value. It is now easy to determine who are the natural leaders. In the same manner, one may quickly pick out those individuals who are neglected by the other members. The lines of attraction and repulsion, both mutual and unreciprocated, that exist among a group's members are pointed out and the existence of cliques and spheres of influence and their

lines of demarcation can also be discovered. The significance of such knowledge is far-reaching and very interesting but it is a topic that goes beyond the bounds of this study.

Much of the information that is supplied by the sociometric technique is known almost intuitively by the individual members of the group to which it is applied, but it is highly improbable that any member is aware of the total picture. Thus the members of a group are aware to some extent of group structure; and--as has been shown by Jennings²--will suggest, if asked, what personal qualities are possessed by the individual members of the group. An adequate picture of group structure, however, could not be derived from such intuitive knowledge nor could one derive a reliable assessment of the personality traits that are related to status in the group. The present study is concerned with showing the relation, if any, between measurements of group structure and measurements of personality.

² Helen H. Jennings, Leadership and Isolation (New York: Longmans, Green and Company, 1943).

The problem that is being investigated can be divided into two parts. The first part concerns itself with determining the role that personality factors play in the structuring of specific social groups. In this section, the following points will be discussed:

(a) The relationship of personality traits to amount of attraction. (Amount of attraction refers to the number of choices a person receives).

(b) The degree of similarity in personality traits of individuals who choose each other.

In the second part, the relationship of individual efficiency* to sociometric measures will be investigated.

This section will cover the following points:

(a) The significance of efficiency in the selection of associates for specific activities.

(b) The relationship that exists between efficiency and group structure.

Certain sociometric terms which have a common usage, as well as technical meaning for sociometry, are defined in the glossary to be found in Appendix A.

* In this study efficiency is defined as skill in performing the tasks associated with running the Home Management House.

CHAPTER II

HISTORICAL SURVEY

Sociometry as a recognized technique is of recent origin. Its formal beginning dates back to the publication of Dr. J. L. Moreno's Who Shall Survive in 1934. This book is generally regarded as the first important work to be published in the field. Moreno was largely responsible for the development of the sociometric technique and this work was a report and discussion of his experimental findings.

In this book, Moreno describes his work in a Training School for Girls. At this school he administered a sociometric test, the results of which were used to reorganize the group structure of the school. This test was a refinement of the technique he had devised to reorganize a heterogeneous community that had suddenly sprung up near Vienne at the time of the First World War. In his description of the results, Moreno coined a number of terms which were to become fundamental concepts of sociometry. Notable examples are the words "star" and "isolate" to denote very highly chosen individuals and neglected individuals respectively. He describes the bonds of attraction and rejection and translated his results into a diagram of the group structure.

The effect of this book was to stimulate an interest in sociometry and this interest was reflected in the increasing amount of experimental activity that followed. Despite the amount of activity in the field, very few major works have appeared and most of the available material is in the form of articles. The appearance of the periodical Sociometry, A Journal of Interpersonal Relations, in 1937 has facilitated the publication of many of these articles and has served as an important organizing factor of the activity in the field of sociometry.

The research work that has been and is being conducted in the field of sociometry is very diverse. This is undoubtedly due to the fact that sociometry is capable of application in a wide variety of fields. Much of what is being written is devoted to the theoretical aspects of sociometry, especially to its mathematical basis. This is very important in that sociometry, like any other field of experimental investigation, requires a quantitative frame of reference. Bronfenbrenner³ and Criswell⁴ have been

³ Urie Bronfenbrenner, "A Constant Frame of Reference for Sociometric Research" Part II. Experiment and Inference, Sociometry, VII (Feb. 1944) pp. 40-76.

⁴ Joan H. Criswell, "The Measurement of Group Integration," Sociometry, X, (1947) pp. 259-269.

prominent among those who have been developing the mathematical basis of sociometry while Moreno^{5,6} has shown the relationship of sociometry to the other social sciences.

Among the many experiments that have been conducted are those which attempt to determine the relationship of sociometric measures to a variety of personal and environmental factors. Criswell⁷ made a sociometric study of racial cleavage in a school in which 75% of the school population was negro. In another report, Hartley and Mentz⁸ described a technique for the study of the dynamics of the racial saturation point, that is, to determine the factors entering into the acceptance of individuals of one race into a group in which the members belonged to another race and how the assimilation process ceases when the number of individuals entering into the group increases to the point where conflict develops within the group.

⁵ J. L. Moreno, "Sociometry in Relation to Other Social Sciences" Sociometry (1937) pp. 206-220.

⁶ J. L. Moreno, "Progress and Pitfalls in Sociometric Theory," Sociometry, X (1947) pp. 268-273.

⁷ Joan H. Criswell, "Racial Cleavage in Negro White Groups," Sociometry, I (July 1937) pp. 81-90.

⁸ Eugene T. Hartley and Alexander Mentz, "A Technique for the Study of the Dynamics of the Racial Saturation Point," Sociometry, IX (Feb. 1946) pp. 14-21.

In other studies, the relationship of sociometric scores to such elements as age, attitudes, interests, academic achievement, etc., have been shown. In this area, the studies made by Pintner, Forlano and Freedman⁹, Northway¹⁰ and Bonney¹¹ are typical.

In the applied field, sociometry has been used in the industrial setting. The object in this case generally has been to determine the best possible work group in an industrial organization from a sociometric view. Jacobs¹² and Rodgers¹³ discuss the uses of sociometry in industry. The result of all this activity has been to demonstrate clearly that sociometry can make a definite contribution in these fields.

⁹ Rudolf Pintner, G. Forlano and H. Freedman, "Personality and Attitudinal Similarity Among Classroom Friends," J. Appl. Psych. XVI (1937) pp. 48-65.

¹⁰ Mary L. Northway, "Outsiders, A Study of the Personality Patterns of Children Least Acceptable to their Age Mates," Sociometry, VII (Feb. 1944) pp. 10-46.

¹¹ Merl E. Bonney, "A Sociometric Study of the Relationships of Some Factors to Mutual Friendships on the Elementary, Secondary and College Levels," Sociometry, IX (February 1946) pp. 21-48.

¹² John H. Jacobs, "The Application of Sociometry to Industry," Sociometry, VIII, (May 1945) pp. 181-199.

¹³ Maria Rodgers, "Problems of Human Relations in Industry" Sociometry, IX, (November 1946) pp. 350-372.

One of the most important topics in sociometry is the problem regarding the reason why a particular interpersonal structure exists. Why is Individual A so highly chosen and Individual B neglected? What is the reason for the mutual attraction of C and D? Why does E choose F highly and F not choose E at all? Why does G choose H on one criterion and not on another? In short, what is the basis for choice and does this basis vary from individual to individual, from group to group and from situation to situation?

Many investigators believe that one of the most important factors entering into choice selection is personality. Nevertheless the personality factors entering into selection have not been adequately determined. Jennings, perhaps the most important investigator in the field, makes the following pertinent observation:

It is recognized that the correspondence of overt personality (personality as it is displayed through observable behavior) with that part of the inner dynamics of personality tapped by the choice process of attraction and repulsion is quite likely not a one-to-one relation in any case.¹⁴

¹⁴ Jennings, op. cit., pp. 23-24.

This statement suggests the difficulty attached to any investigation that attempts to relate personality factors to sociometric choice pattern.

Jennings' book, Leadership and Isolation, from which the foregoing quotation was taken, is a major study of the personality of leaders and isolates; leaders and isolates being determined by a sociometric test. In her approach, she made a thorough descriptive analysis of the personalities of several leaders and several isolates. Her conclusion is embodied in the following statement:

It might be conjectured that individuals who are "sent" into isolation or "elevated" to leadership respectively by the membership of the community as a whole might in each instance be found to resemble one another as a group in their respective personality attributes; the findings, however, reveal both isolates as individuals and leaders as individuals not only to resemble but to differ markedly in personality from one another as they vary from each other as a group.¹⁵

In brief, Jennings came to the conclusion that qualities of personality did not in themselves account for one individual being a leader while another was an isolate but rather the differences between leaders and isolates lie in their manner of interacting with others, that is their ability to overcome the gap that exists between their own personalities and those of other people.

¹⁵ Ibid., p. 165.

While there is a certain similarity between Jennings' investigations and this study, there is a decided difference in approach. Jennings made an intensive descriptive study of the personality of a number of isolates and a number of stars. This was done by taking certain stars and isolates separately and making what might be described as a clinical study of the individual. To this end, the physical characteristics and mannerisms of the individual in question were given. This was followed by a description of the overt personality characteristics of each individual as manifested by the individual's conduct in certain specific social situations. It should be noted, however, that this investigation did not study numerous specific personality traits and relate them from individual to individual. It could very well be that while isolates and stars showed wide differences among themselves in the traits which were dominant to their respective personalities, there might be a high degree of similarity on certain significant traits. This being true, one may question the justification for her conclusions.

Bonney, in a study of some factors relating to mutual friendships, included personality as one factor.¹⁶ He

¹⁶ Bonney, op. cit.

made use of the California Test of Personality and determined the correlation of scores on the test between the two members of a mutual pair and, similarly, between the pairs of an unreciprocated choice. He also determined the differences between mutuals and unreciprocated pairs in percentile ranks. Mutuals and unreciprocated pairs are differentiated on a scale varying from very mutual in which each person gave the other at least 40% of the maximum number of choices to very unreciprocated in which one gives more than 40% of the maximum number of choices to the other but receives less than 20% of the maximum number of choices. In his results, he found no significant relationship to exist between either mutual pairs or unreciprocated pairs in regard to personality as measured by the California Test of Personality.

The California Test of Personality which Bonney used consists of a combination of more or less specific tendencies to feel, think, and act.¹⁷ These tendencies are not necessarily general traits. These components are grouped into two sections:

- (a) Self-adjustment--based on feelings of personal security.

¹⁷ E. W. Tiegs and W. W. Clark and F. P. Thorpe, California Test of Personality Manual of Directions, (California Test Bureau 1939).

(b) Social Adjustment--based on feelings of social security.

While scores are given for each of the twelve components tested, the results are usually expressed in a composite score for self-adjustment and a composite score for social-adjustment. A total adjustment score representing a balance between self and social adjustment is also determined.

Bonney determined the relationship of these adjustment scores to mutual pairs and to unreciprocated pairs. This procedure, however, does not take into account specific personality traits but a rather vague personality pattern. Since this is true, differences in personality which, when taken singly, prove to be significant; may, when combined, be wiped out. This being true, Bonney's findings must be interpreted as meaning that in regard to adjustment scores as determined by the California Test of Personality, no significant relationship is found to exist between either mutual pairs or unreciprocated pairs. Further conclusions would not be justified.

The present study, in addition to investigating the role played by personality traits, seeks to determine to what extent the quality of efficiency is related to sociometric measures. It also asks the question of whether a highly differentiated group is more efficient than a group which shows less differentiation.* Very little experimental material in the field of sociometry is available on this important problem.

* Differentiation occurs when the pattern of sociometric scores differs from that expected by chance.

CHAPTER III

OUTLINE OF PROCEDURE

A Source of Data

The data gathered in this investigation was obtained from eighty-four women students in the third year of the Faculty of Home Economics. Each student was enrolled in the Child Development and Household Management Course, the laboratory work of which consists of practical work and responsibility carried on for a period of one month during residence at the Home Management House under the supervision of a resident instructor.¹⁸ For purposes of residence, the women were divided into six equal groups of fourteen, one group to succeed the other after a period of one month throughout the academic year. The present study considered these six groups.

The manner in which these groups were selected is very important. The students were asked to divide themselves into six groups. To this end they would first (mutually) select the person with whom they would share a room while in residence, and the individual pairs would then get together until the six groups were determined.

¹⁸ The Home Management House consists of a large dwelling situated on the University Campus.

It was not necessary, therefore, that any individual be attached to a group to which she did not care to be a member. This procedure is practiced by the Child Development and Household Management Department so the groups and the individuals who comprise them will be as harmonious and congenial as possible. Since this is true, the groups are to a large extent sociometrically arranged.

The students have known each other for a period of at least two years. During this period, they have attended the majority of their classes together and have had numerous opportunities to participate with one another in class activities.

B Materials Used:

1. Sociometric Test

Each group was given a form of sociometric test of which a specimen form is given in Appendix B. It is not a sociometric test in the sense in which this term is generally understood. The sociometric test specifies that the results will be used to change existing situations into more satisfactory ones. In the present situation, this was neither possible nor desirable. To begin with, the period of residence was for one month only and the sociometric test was not administered until the end of this period. Added to this was the fact that the girls had

arranged themselves into these specific groups and it is very doubtful whether changes would be desired in any case.

Nevertheless even near-sociometric data can reveal fundamental information concerning the interpersonal group structure. Jennings, referring to Theodore M. Newcomb's study, Personality and Social Change, makes the following statement:

This study is also notable because it is the first to demonstrate that even near-sociometric data, i.e., data given by the individual on the basis of hypothetical criteria which are not to be experienced by him and hence "unreal" data not to be used to alter the individual's situation, reveal crucial information about a community when secured under circumstances which enlist the co-operation of the population as a whole.¹⁹

The Co-operation of the groups was obtained in this study. Moreover no one was required to give information as to whether she would dislike having certain persons for associates, as is frequently done in sociometric studies. This information was not sought for two reasons:

(i) the investigator had not established confidence over a sufficient period of time to make such information easy to obtain.

(ii) the groups had chosen themselves and cases of repulsion would be infrequent.

¹⁹ Jennings, loc. cit., p. 15

This test was especially constructed to obtain a sociometric measure of the groups in question. For this, five criteria in, ^{respect of} which it would be possible for the members of a group to have interrelations were employed. Three of the five questions refer to situations specific to experiences in the Home Management House and two refer to situations outside.

The reasons for including each question are as follows:

Question No. 1. Suppose you were to spend another month at the Home Management House. Which members from your present group would you most like to have with you?

This first question was basic to the test. It was thought that this question would reveal those members of the group viewed (by the group) as the most desirable companions in the total environment.

Question No. 2. If you were acting as First Cook, whom would you most like to have as Second Cook?

Question No. 3. If you were Assistant Child Director, whom would you prefer to have as Child Director?

In these two questions the two duties in which there is close co-operation between two members of the group are being used as criteria.²⁰ The inversion of superior-

²⁰ While in the Home Management House, there are specific duties which each student must perform in order that the household be run efficiently. Each student must perform every task for a definite period of time and these tasks are performed in rotation.

inferior positions from the standpoint of the person being questioned was arranged purposely as a possible point for inquiry as to choice pattern.

Question No. 4. Whom would you prefer to have accompany you on a double-date to a special social affair? You may include any member from the entire III Year Home Economics Class.

Question No. 5. Name in preference three girls with whom you would like to participate in some extra-curricular class activity.

These two questions involve extra-curricular activities. Two criteria were employed in that Question No. 4 entails contact with members of the opposite sex thought to be an important element in the selection of a companion. Choices outside the group were allowed so as to give a picture of the cohesiveness of the various groups. This was not possible in the other situations in that an individual's experiences in those situations were as a member of a specific group.

Three choices were allowed on each question. It was felt that this would give a fairly complete group picture whereas further choices would have made the results less meaningful. In scoring the test, each choice was given equal weight. There were two reasons for this. The first reason is that while there is a real distinction in an individual's first, second and third choices, it ^{maybe} ~~is~~ qualitative rather than quantitative and is not the same in

every case. Second, a satisfactory statistical device for weighting the choices has not been developed.

To test the reliability of the test it was administered to one of the groups twice. The group had been in the Home Management House ten days when it was first given. The second time, it was administered three weeks later. The results gave a product-moment correlation coefficient of .91. While this is a high reliability coefficient, it should be noted that interpersonal structure is dynamic and is therefore constantly subject to change. Such change, however, is very gradual and not easily perceptible. One of the uses of the sociometric test is to detect such changes and show them graphically.

No test of validity is necessary for a sociometric test. Jennings states:

The sociometric test is unlike the usual mental test in that it does not attempt to measure behavior of a certain type by eliciting related responses but employs a sample of the actual behavior studied. As such, the sample is directly meaningful and need not be validated by relating it to an external criterion.²¹*

2. Personality Inventory

The Guilford-Martin Personality Inventory was used to determine measures of personality traits. In the construction of this test, factorial methods were used. It consists of 511 questions which are answered by encircling either "Yes", "?", or "No." It takes approximately one

²¹ Ibid., p. 27

* In this study a test of validity would not be possible.

hour and a half to complete and is easily scored. The responses are scored in terms of thirteen independent traits of personality. Another important feature is that the scores are arranged so that a score in one trait has the same meaning as a similar score on any other trait. A description of these traits is given in Appendix C.

The Guilford-Martin Personality Inventory was standardized on a group of 500 people, half male and half female, the majority of which were high school and university students. In the standardization, the results of this population were plotted as a normal curve. The scores of the middle 20% of the cases were taken to represent a scale value of 5, while the upper 40% were arranged within the values 6 - 10 and the lower 40% within the values 0 - 4. In the M factor (masculinity-femininity) the values 0 - 4 and 6 - 10 encompass 86% of the cases instead of 80%. All values are given in whole numbers.

3. Efficiency Ratings

While the students are in the Home Management House they are rated individually on many factors. For this investigation the ratings on general efficiency as well as specific ratings of efficiency in cooking and child care were obtained. Overall ratings comprising a composite of those factors which enter into effective operation were

also obtained for each individual. Thus in addition to skill, such factors as success in working with others and exactness would also be included. The latter is the practical mark that the students receive in the course.

In addition, the groups were ranked in order of effectiveness with the most effective first. The individual ratings of effectiveness were out of one hundred while the ratings on general efficiency, efficiency in cooking and efficiency in child care were out of ten.

C Testing Procedure:

As previously stated, each group was given the sociometric test near the end of its period of residence. In administering this test, the subjects were informed that the purpose of the questionnaire was to investigate something of the dynamics of social groups. It was also stated that the replies would be strictly confidential and that no reference would be made to any individual by name. As the investigator also had the sanction and support of their instructor, excellent co-operation was given.

The entire population of eighty-four was gathered together and the personality inventory administered to them. It was stated that the results of this test which was to be confidential also, would be used in relation to the other questionnaire. It was stated that the object was to

determine what kind of person chose another. Co-operation was encouraged by offering to discuss the results with those individuals who were interested. About one-half of the subjects took advantage of this offer.

CHAPTER IV

ANALYSIS OF THE EXPERIMENTAL FINDINGS

1. Introduction

If a group of strangers were brought together and asked to choose each other as associates for certain activities, there would be no basis for choice and sociometric scores would be distributed at random. A group of people who are acquainted with one another and who are asked to choose each other in the same manner do have some basis for choice and we find that sociometric scores are not distributed at random. In essence the group is structured and it is assumed that certain factors have operated to give other than chance distribution. The structure is such that certain individuals have very low sociometric scores, that is, they are underchosen while other individuals have very high sociometric scores, that is, they are overchosen.

In order to feel certain that cases where individuals are underchosen or overchosen are not chance products, the critical score which separates them from the rest of the group is fixed at a point which could occur by chance only once in fifty times.²² Since it was

²² See discussion Page 27.

found in this study that such cases number twenty-eight when by chance we could expect only 12/50, it is highly improbable that such results would occur by chance and consequently underchosen and overchosen appear to be real categories produced by forces other than chance.²³

The hypothesis set up for investigation is that group structure is determined to some extent by the personality characteristics of the individual members who form the group. Personality characteristics will, therefore, account, in part, for an individual's position in the group and also should play a role in the formation of mutual pairs and cliques.

If the relative strength and direction of bonds are dictated by personality traits, then where a group is well structured, that is, showing a high degree of differentiation, there should be a relationship between personality traits and sociometric score. Conversely if when there is a lack of structure--that is, a structure showing a low degree of differentiation--there is ~~also~~ an absence of this relationship, it argues for the importance of personality traits in structuring.

²³ Since we could expect by chance only one overchosen and only one underchosen person in fifty times in each group and, since there are six groups, the total number of overchosen and underchosen expected by chance in all groups is 6×2 or 12/50.

It might be assumed that when groups are structured according to some principle or principles there will be a better structure than if ~~they~~ were not. If personality traits contribute to the determination of structure, a further question may be put -- In those groups where structure is closely related to characteristics of personality of its members, is the group a "better" group, in any sense, than one where this relationship does not hold to the same extent? In this study, the best independent criterion for better or worse groups that could be obtained was that of efficiency so that as part of the problem the data will be analyzed to determine whether or not the most efficient groups are those in which there is the closest relationship between personality traits and sociometric scores.

2. Sociometric Score Classification

In this investigation, the results of the sociometric test given to each group were plotted on a scoring chart and the total number of choices received by an individual on all sociometric criteria were determined.²⁴ In the next step, the sociometric scores of all the subjects were divided into three classes:

²⁴ The complete scoring charts for all groups are to be found in Appendix D.

- (a) those scores with the chance level of expectancy.
- (b) those scores which are significantly above chance.
- (c) those scores which are significantly below chance.

The mean of the scores given within the group was set as the score to be expected by chance. Scores above the mean which had a probability of occurrence less than .02 were regarded as scores significantly above chance. In the other direction, those scores below the mean which had a probability of occurrence less than .02 were regarded as scores significantly below chance. The level of probability was set at .02--a point more discriminating than the .05 probability level usually set for psychological data. The main reason for setting such a fine discrimination was due to the fact that individuals within the groups formed on the basis of this classification were to be later compared with one another and it is, therefore, imperative that those selected be really overchosen and really underchosen.

The exact chance score was ascertained by counting each choice actually given by a subject to other subjects within the group, computing the total of these choices for all subjects and then dividing this total by the number of subjects in the group. In effect, the exact chance score is the mean. (All the groups studied contained fourteen

members). Choices going outside the group were omitted.

To determine the exact score at a chance level of .02, the t value was used. At a chance level of .02, the t value is 2.06. The score (X) was found by solving the formula

$$2.06 = \frac{X - np.}{\sqrt{np.q.}}$$

where 2.06 is the t value,

np. is the mean,

$\sqrt{np.q.}$ is the standard deviation.

This formula was applied to all the groups individually. As choices going outside the group were not included, differences existed in the mean scores of each group.*

After having separated the scores of the members of each group into the three categories specified, the six groups were combined on this basis for comparison. In this manner, three groups were left:

- (a) the group whose sociometric scores fell within the set chance level of expectancy.
- (b) the group whose scores were significantly above chance.
- (c) the group whose scores were significantly below chance.

These groups were then designated as "average," "overchosen" and "underchosen" respectively. There were fifty-six subjects in the average group and fourteen each in the overchosen and underchosen groups.

* Choices given within the group ranged from 205 for Group B to 180 for Group D.

3. Guilford-Martin Personality Inventory

The Guilford-Martin Personality Inventory was administered to every subject and the scores for each subject on each of the thirteen traits were determined.²⁵ The C-scores (scaled scores) are in essence standard scores and on the whole high scores are more desirable than low scores. While low scores are least desirable, extremely high scores in certain traits may be indicative of poor adjustment. To facilitate a clear understanding of ensuing discussions relating to the Guilford-Martin Personality Inventory, a brief interpretation of each of the thirteen traits is presented here.²⁶

In the S factor (social introversion-extraversion) a high C-score indicates sociability, a tendency to seek social contacts and to enjoy the company of others; while a low C-score indicates shyness, a tendency to withdraw from social situations and to be seclusive. A high C-score is more desirable for mental health than a low C-score.

²⁵ The individual scores on the Guilford-Martin Personality Inventory are to be found in Appendix E.

²⁶ The ensuing descriptions are abstracts taken from the Guilford-Martin Temperament Profile Chart.

A high C-score in the T factor (thinking Introversion-extroversion) indicates a lack of introspectiveness and an extrovertive orientation of the thinking process. A low C-score indicates an inclination to meditative thinking and an introspective disposition. The middle range of C-scores is more desirable for mental health although each extreme may have certain occupational value.

A high C-score on the D factor (depression) indicates freedom from depression and a cheerful, optimistic disposition while a low C-score indicates a chronically depressed mood, including feelings of unworthiness and guilt. The higher the C-score in this trait the more favorable the emotional adjustment of the individual.

C - (cycloid disposition) is the factor measuring emotional fluctuations. A high C-score indicates stable emotional reactions and moods while a low C-score means the presence of cycloid tendencies as shown in strong emotional reactions, fluctuations in mood, and a disposition toward flightiness and instability. While the higher the C-score the better the emotional adjustment of the individual, an extremely high score may indicate a colorless and inert individual.

A high C-score on the R factor (rhythymia) indicates a carefree disposition, liveliness and impulsiveness while a low C-score indicates an inhibited disposition and an overcontrol of the impulses. A C-score in the middle ranges is desirable for mental health as both extremes may represent psychological maladjustments.

G - (general activity) scales the tendency to vigorous overt action. A low C-score indicates a tendency to inertness. A C-score in the middle ranges is more desirable for mental health as an extremely high C-score may represent a manic tendency and a low C-score may be an indication of a hypothyroid condition or other causes of inactivity.

In the A-factor (ascendance-submission) a high C-score indicates social leadership; and a low C-score, social passiveness. No general rule can be set forth as to what C-scores on this trait are most desirable for mental health although our culture emphasizes the general desirability of a high score on this trait.

In the M-factor (masculinity-femininity) a sex division occurs as this trait scales emotional and temperamental make-up in terms of masculinity and femininity. While most women have C-scores below 5 and most men C-scores above 5, there is a tendency for the

C-scores of the two sexes to approach a common mean with increased age. In effect, men as they grow older become more feminine and women more masculine in their respective attitudes and interests.

A high C-score on trait I (inferiority feelings) represents self-confidence and a lack of inferiority feelings, while a low C-score indicates lack of confidence and feelings of inadequacy and inferiority. The higher the C-score on trait I, the better for mental health; although extremely high cases may be revealed as a superiority compensation for hidden inferiority feelings.

N - (nervousness). A high C-score indicates freedom from nervous tension and a tendency to be calm, unruffled and relaxed; while a low C-score indicates a tendency to be easily distracted, irritated and annoyed. The higher the C-score the better for mental health.

In the O-factor (objectivity) a high C-score points to a tendency to view one's self and surroundings objectively and dispassionately while a low C-score indicates a tendency to take everything personally and to be hypersensitive. The higher the C-score on this trait the better for mental health.

A high C-score in trait Ag (agreeableness) indicates an agreeable lack of quarrelsomeness and a lack of domineering qualities and a low C-score indicates a belligerent, domineering attitude and an overreadiness to fight over trifles.

In trait Co (co-operativeness) a high C-score indicates a willingness to accept things and people as they are and a generally tolerant attitude while a low C-score indicates an intolerant attitude and an over-criticalness of people and things. As a rule, the higher the C-score on trait Co, the better for mental health.

4. Personality Traits and Sociometric Classification

If personality traits determine the direction and strength of bonds then as between overchosen and underchosen one should expect to find differences in personality traits. In those traits in which leaders might be expected to score high, the average group should fall between the overchosen and the underchosen groups, but where leaders might be expected to score in the upper middle range, the average group might be expected to fall either above or below. One should expect that the leaders would score especially high in those personality traits which imply association with other people. Leaders would not be expected to have low scores on any ^{part} score. If this is

found to be true and if leaders are distinguishable on traits having to do with association with other people, it is evidence of the importance of personality traits in the structuring of groups.

In order to investigate this hypothesis, the subjects were divided into three classes--average, overchosen and underchosen. With each of these three groups, the scores of the individual members on each of the thirteen traits measured in the Guilford-Martin Personality Inventory were combined and the group means on each of the thirteen traits determined. The results, given in Table 1, make it possible to make a number of interesting observations based on the data presented in the table.

Comparing the average with the overchosen group, there are six factors in which the means of the overchosen group are higher than the means of the average group. These factors are S, R, G, A, M and I. In the remaining seven factors, namely T, D, C, N, O, Ag and Co, the average group has means that are higher than the means of the overchosen group.

Since none of the differences between these two groups is statistically significant,* it is quite possible that the arrangement was a chance occurrence and that a retest might result in a complete reversal in position of

* SEE FOOT NOTE TABLE I PAGE 35.

TABLE I

COMPARISON OF MEANS OF OVERCHOSEN, AVERAGE AND UNDERCHOSEN
ON GUILFORD-MARTIN PERSONALITY INVENTORY

<u>GROUP</u>	<u>NUMBER</u>	<u>S</u> [*]	<u>T</u>	<u>D</u>	<u>C</u>	<u>R</u>	<u>G</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>N</u>	<u>O</u>	<u>AG</u>	<u>CO</u>
Overchosen	14	6.07	4.71	5.36	5.07	5.79	4.71	5.00	4.00	5.07	4.93	5.00	5.00	5.57
Average	56	5.04	5.29	5.71	5.59	5.41	4.34	4.59	3.73	4.61	5.16	5.45	5.46	5.82
Underchosen	14	3.78	4.50	4.29	4.79	4.00	3.00	3.71	3.57	3.71	4.43	4.56	5.07	5.21

* THE LARGEST DIFFERENCE BETWEEN THE MEANS OF THE OVERCHOSEN AND AVERAGE GROUPS OCCURS IN FACTOR 5. THE t VALUE IS **4.71** AND THE PROBABILITY IS **0.027**.

these traits. While further investigation is necessary to determine whether the differences between the mean trait scores were due to chance or whether a stable relationship exists, the pattern that does occur seems to make some psychological sense. This interpretation is based on the observation that the traits in which the overchosen group are superior to the average group are the factors that have the most to do with the relationship with other people; while the traits in which the average group are superior are not necessarily important in regard to one's relationships with other people.

IF THIS PATTERN SHOULD PROVE TO HOLD,
~~In illustration,~~ we see that the overchosen group are, on the whole, more sociable, more carefree and impulsive, more energetic, more masculine in their attitudes and interests and more self-confident than the average group. These qualities of personality would all be important in assessing qualities generally regarded as necessary for successful social interaction.

On the other hand, in examining those factors in which the average group had higher means than the overchosen group, we see that from an interpretation in terms of absolute scores that the overchosen group are a little more introspective in their thinking habits, are not as optimistic, show more fluctuations in mood, are inclined to have greater nervous tension, are not as objective,

are more domineering and more critical of people and things.

The traits Ag and Co were described above as showing the overchosen group to be more domineering and more critical of people and things than the average group. While both these traits have to do with social interaction, it must be emphasized that we are speaking in terms of absolute scores and that the mean scores of the overchosen group in these traits are good scores. Moreover it is not a necessary requisite of a leader that he be very agreeable and very co-operative.

The other five factors embrace traits which have to do largely with a person's tendencies to feel and think. They do not necessarily affect one's social relationships unless, of course, one varies extremely from the average of the general population. The personality scores suggest, therefore, that while the members of the overchosen group have, on the average, those qualities of personality necessary for successful social interaction they are not superior in those qualities pertaining to inner, personal feelings.

While there is no statistical basis for differentiating the overchosen from the average group, there is definite statistical evidence for differentiating

both these groups from the underchosen group on the basis of personality traits. Both the overchosen and average groups have personality trait scores that are consistently higher than the personality trait scores of the underchosen group.

Although when one compares the average group with the underchosen group a difference between mean trait scores is evident throughout, though only one of these differences is statistically significant. Trait D (depression), the one personality trait over which the two groups differ significantly, has a t value of 2.18 which is equivalent to a probability value of .03. Nevertheless, the trend for better scores in the average groups is especially evident as an examination of the mean scores of both groups reveals that while the means of the average group are, on the whole, within the range described by Guilford as most desirable for mental health, the means of the underchosen group are low in all but two factors (Ag and Co).

When comparing the overchosen group with the underchosen group, an even more striking picture is revealed. In twelve of the thirteen traits, the mean of the overchosen group is higher than the mean of the underchosen group. In the one trait, Ag, where the mean of the underchosen is higher, the difference between the means is negligible.

Moreover, between the overchosen and underchosen groups, four personality traits stand out as having statistically significant differences. These four traits are G (General pressure for overt activity), I (Inferiority), S (Social introversion-extroversion) and R (Rhathymia). The t value and probability value for the differences in the means of these two groups on each of the thirteen traits are as follows:

<u>Trait</u>	<u>t value</u>	<u>Probability</u>
S*	3.45	0.0006
T	0.39	0.67
D	1.58	0.11
C	0.40	0.69
R*	3.42	0.0006
G*	2.20	0.03
A	1.56	0.12
M*	1.05	0.29
I*	2.13	0.03
N	0.83	0.41
O	0.80	0.42
Ag	0.09	0.93
Co.	0.60	0.55

The fact that there exists a statistically significant difference between the overchosen and underchosen groups on traits S, R, G and I suggests the possibility that these traits may be important factors in determining group structure. This is further substantiated since

* indicates a statistically significant difference in the means.

these four traits also show consistent differences between the overchosen and average groups. In addition, these four traits are traits which have to do with social interaction and, as such, one would expect the leaders to have superior scores.

Since leadership is ~~associated~~ ^{associated} with sociometric score,* the overchosen group consists of group leaders. The qualities of personality of the leaders that distinguish them as leaders are factors S, R, G and I. Factors S and R, which stand out especially, show the leader to be a person who seeks social contacts, is carefree and not too inhibited. Factors G and I, which are also significant in distinguishing the leader, show him to be, on the average, more energetic and more self-confident than the other members of the group. Perhaps even more important for leadership than these traits taken singly would be the pattern that the traits take in the personality structure of the leadership.

While the foregoing discussion has pointed out the distinguishing features of the overchosen group, especially in ~~contrast~~ ^{contrast} to the underchosen group, the discussion was based on findings that have to do with average scores. If it were also found that in the overchosen and underchosen groups the individuals who comprise these groups differ

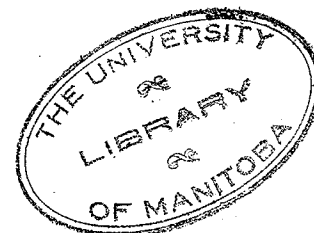
* Jennings, *op. cit.*

significantly from one another in the distribution of their scores, it would be additional evidence for the validity of these findings.

In order to test the distribution of the scores of the members of the overchosen group as compared to the distribution of the scores of the members of the underchosen group, the chi-square technique was employed. A two-by-two table was used.

	0-4	5-10
Overchosen		
Underchosen		

The number of the individuals of the overchosen group who scored four or less was placed in the upper left-hand corner while in the lower left-hand corner was placed the number of individuals of the underchosen group who scored four or less. Similarly, in the upper right-hand corner, was placed the number of the individuals of the overchosen group who scored five or more; and in the lower right-hand corner was placed the number of individuals of the underchosen group who scored five or more. Expected frequencies for each category were then determined.



Because of the small samples being used (fourteen in each group) the correction for continuity was made in the calculation of the chi square.²⁷ The chi square values are shown in Table II. All values 3.841 and over are statistically significant at the 0.05 level.

Examination of Table II reveals that the distribution of underchosen scores differs significantly from the distribution of overchosen in three factors--S, R and G. Since these three factors also had means showing a significant difference between the two groups, added support is given to the suggestion that these factors are important in structuring groups.

To further test the significance of the differences between the overchosen and underchosen groups in personality traits, those traits suggested by Guilford in his manual²⁸ as having a certain range of score desirable for mental health were pooled together for each group. This pool included factors S, T, D, C, R, G, I, N, O and Ag. The scores on each of these traits were divided into two categories for each group. One category included those scores suggested by Guilford as most desirable for mental

²⁷Formula used was:
$$\chi^2 = \sum \left(\frac{[(fo - fe) - .5]^2}{fe} \right)$$

²⁸ J.P. Guilford and H. G. Martin, An Inventory of Factors GAMIN: Manual of Directions and Norms.

TABLE II

VALUES OF CHI SQUARE OBTAINED WHEN OVERCHOSEN AND UNDERCHOSEN
DISTRIBUTIONS COMPARED IN THIRTEEN FACTORS

	S	T	D	C	R	G	A	M	I	N	O	AG	Co
CHI SQUARE	5.39	0	1.28	0	5.39	5.16	1.31	0.50	1.40	0.14	0	0	0.17

health while the other category contained all the other scores. The chi-square technique was then applied.

The value of chi squared thus obtained was 16.79 which is significant at more than 0.01 level. This result indicates that the overchosen group, on the basis of their personality scores, seem to be better adjusted than the underchosen group. It also gives support to the hypothesis that personality factors do play a part in the structuring of groups.

By dividing the subjects into groups of overchosen, average and underchosen and comparing these groups with each other in respect to personality traits, a degree of relationship between traits of personality and group structure has been shown to exist. While this form of classification indicates what traits are important to group structure, a more accurate picture would be given if each trait were correlated directly with the sociometric scores of each group.

The correlation coefficients between the sociometric scores and the thirteen personality traits were determined for all six groups. These coefficients of correlation are

presented in Table III.²⁹

An examination of this table shows a very large number of positive correlations. Only fourteen of the 78 coefficients tabled are negative. If the "r" factor for each trait were averaged, the result would be positive. Similarly the average "r" on all the traits for each group will also be found to be positive.

Since the coefficients for each trait vary from group to group, it is suggested that this variation ~~is~~ *may be* related in some way to the manner in which the group functions. This hypothesis has been investigated and the findings are discussed later on in this chapter.

5. Mutuals and Unrelated Pairs

A very important element in group structure is the occurrence of pairs of individuals who choose each other. Such cases are frequently described as mutuals and a mutual bond is said to exist between them. The questions that naturally arise are: *Why* do two people choose each other? and *Why* do they not form a mutual bond with a certain

²⁹ All correlation coefficients referred to in this study were obtained from product-moment correlation unless otherwise stated. The formulae used were:

$$\text{(Product-Moment)} \quad r = \frac{\sum XY - M_x M_y}{\sigma_x \sigma_y}$$

$$\text{(Rank Order)} \quad \rho = 1 - \frac{6 \sum D^2}{N(N^2 - 1)}$$

TABLE III

CORRELATIONS OF SOCIOMETRIC SCORES WITH GUILFORD-MARTIN PERSONALITY TRAITS

<u>GROUP</u>	<u>S</u>	<u>T</u>	<u>D</u>	<u>C</u>	<u>R</u>	<u>G</u>	<u>A</u>	<u>M</u>	<u>I</u>	<u>N</u>	<u>O</u>	<u>AG</u>	<u>Co</u>
A	.12	-.09	.18	.04	.35	.32	.12	-.07	.28	-.16	-.05	-.14	.32
B	.24	.46	.15	.12	.12	-.29	-.09	.10	.11	.32	.30	.37	.39
C	.50	-.03	.22	.20	.06	.17	.17	.26	.27	.19	.21	.38	.18
D	.65	.20	.41	.39	.62	.69	.67	.33	.58	.20	.28	.11	.13
E	.10	-.26	.43	.09	.10	-.40	.11	-.16	-.07	.26	.48	-.12	-.17
F	.59	.31	.29	.06	.40	.66	.64	-.23	.52	.07	.22	.34	-.41

other member of the group? In effect, what forces interact between individuals that account for the formation of mutual bonds.

This study set out to investigate the role played by personality factors in the structuring of groups. In order to study mutuals and unrelated pairs (pairs within the group where no choice is given by either person to the other on any of the sociometric criteria) all strong mutuals and all unrelated pairs were compared on each of the thirteen personality traits tested by the Guilford-Martin Personality Inventory.

Only strong mutuals were used in this comparison. Strong mutuals are defined as pairs where one individual chooses the other in at least three of the five sociometric criteria and is in turn chosen by her in at least two of the five sociometric criteria. Unrelated pairs have no choices between them in either direction. The reason for this sharp division was that where any choice existed between two individuals, the personality factors that might operate in mutual choice might still be in evidence.

Fifty-six mutual pairs and one hundred and forty-two unrelated pairs were found in the data. The entire number

was used in this investigation.³⁰

The pairs of mutuals and also the unrelated pairs were compared on the thirteen personality traits in the following manner. The personality trait score of one member of the pair was compared with the personality trait score of the other member and the difference, if any, noted. This was done for each of the thirteen personality traits. The difference occurring between the pairs on each trait, whether 0, 1, 2, etc., were tallied and the distribution of these differences in the mutual group were recorded. This was also done for the unrelated group. The two distributions were then compared for significant differences on each of the thirteen traits of personality measured.

An examination of the distribution of differences for each group revealed a statistical problem if the two distributions were to be compared with one another. While direction of the differences between the scores did not concern the investigation, it did make a difference in the distribution. The effect was a distribution that was skewed sharply to the right. This skewness made it

³⁰ It will be noted that the same individual may occur more than once in both the group of mutual pairs and the group of unrelated pairs.

impossible to justify the use of the standard deviation without which the two distributions could not be compared.

This problem was solved by converting the distributions so as to make them closer to the normal curve. This was done by taking the square root of the differences (X) and using these new figures (Y). Thus while a difference of 0 and 1 remain 0 and 1, a difference of 2 becomes 1.41, a difference of 3 becomes 1.73, a difference of 4 becomes 2 and so on. Thus while the rank differences are still the same, the distribution is grouped closer together and assumes the proportions of the normal curve. The means, standard deviations and the significant differences between two means were all determined on the basis of this conversion.³¹ The results are given in Table IV.

An examination of Table IV reveals that in every trait except Co (co-operativeness) the means of the mutual group are lower than the means of the unrelated group. In the one trait Co they are exactly the same. While the

³¹ The following statistical formulae were used throughout:

$$M_X = \frac{\sum X}{N} \qquad \sigma_X = \sqrt{\frac{\sum X^2 - N\bar{X}^2}{N - 1}}$$

$$\sigma_{X-Y} = \sqrt{\frac{\sigma_{M1}^2}{N} + \frac{\sigma_{M2}^2}{N}}$$

TABLE IV

	<u>Mutual</u>		<u>Unrelated</u>		<u>t Value</u>	<u>Level of Significance</u>
	<u>Mean</u>	<u>Sigma</u>	<u>Mean</u>	<u>Sigma</u>		
G	1.18	0.75	1.42	0.66	2.096	0.36
A	1.26	0.87	1.39	0.66	1.01	.3124
M	1.00	0.78	1.16	0.77	1.31	.19
I	1.14	0.63	1.29	0.65	1.54	.124
N	1.20	0.68	1.30	0.69	0.925	.356
S	1.30	0.67	1.32	0.87	0.175	.875
T	1.08	0.72	1.18	0.64	0.91	.3628
D	1.21	0.67	1.26	0.91	0.425	.671
C	1.16	0.73	1.32	0.66	1.435	.152
R	1.02	0.59	1.22	0.69	2.047	.041
O	1.21	0.69	1.23	0.66	0.186	.856
Ag	1.17	0.71	1.19	0.65	0.184	.856
Co	1.05	0.75	1.05	0.69	0	0

differences are in many cases so small as to be insignificant, nevertheless they are consistent differences in the same direction. In two traits, G (general activity) and R (rhythymia), they are significant at the 0.05 level. These same two traits were among the three found significant (G, S and R) when the chi-square technique was applied to the distribution of the overchosen and underchosen groups. They are also two of the four traits (G, I, S, and R) found to be significant when the means of the overchosen and underchosen groups were compared on the thirteen traits of personality measured by the Guilford-Martin Personality Inventory.

Since each group had been, in a sense, sociometrically determined it was possible that unrelated pairs from these groups might not be unrelated. In order to find out whether this was so the chance distribution of the differences of the entire population of eighty-four students that could occur were they all paired with one another at random on each of the thirteen traits was determined. The resulting distribution expected by chance and the distributions of the unrelated pairs, as well as the ^{experimental} distributions of the mutual pairs, were tested by the chi-square technique. The results are given in Table V.

TABLE V

CHI SQUARE VALUES OF MUTUAL PAIRS AND UNRELATED
PAIRS WHEN COMPARED WITH CHANCE

<u>Trait</u>	<u>Chance & Unrelated</u>		<u>Chance & Mutual</u>	
		<i>P</i>		<i>P</i>
S	12.50	(0.10)	3.40	(0.90)
T	7.05	(.50)	4.03	(0.80)
D	5.58	(.70)	2.13	(.95)
C	2.11	(.95)	3.75	(.90)
R	8.18	(.50)	10.50	(.30)
G	9.52	(0.30)	4.37	(0.80)
A	2.64	(.95)	1.21	(0.99)
M	7.91	(.50)	11.86	(0.20)
I	1.14	(.99)	4.37	(0.70)
N	2.49	(.95)	5.12	(0.70)
O	1.44	(.99)	1.96	(.98)
Ag	1.24	(.99)	1.65	(.98)
Co	5.80	(.70)	3.37	(.90)

An examination of Table V reveals no significant probabilities between either chance and unrelated distributions or chance and mutual distributions. It is to be noted that between the distributions of chance expectation and unrelated pairs in factors S, T, G and M, the frequencies of the differences of the unrelated pairs in the small and zero differences are less than what might be expected by chance.

Yule's correction for small samples was applied in every category and none of the chi-square values was found to be significant. To test whether there was a definite trend in the pattern of the differences, a composite score was obtained for the differences in factors S, R, G and I which were found to be significant in distinguishing overchosen and underchosen groups on the basis of personality traits. The composite scores of the differences for the mutual pairs and for the unrelated pairs, as well as the composite score of what might be expected by chance on each of these factors, were determined. This was done by adding the frequencies of a difference of 0, 1, 2, 3, etc., on each of the factors S, R, G and I, giving one combined frequency for each of these differences. The chance frequency in this composition of traits was similarly determined. The distributions of

the group of mutuals and the group of unrelated pairs so obtained were compared with the expected distribution on pure chance by the chi-square technique.

The chi square value between chance and unrelated pairs was 8.37 which has a probability of 0.30. The chi square value obtained between chance and mutual pairs was 17.10 which has a probability of 0.02. The latter value is significant and suggests that the trend in each of the distributions on factors S, R, G and I is similar and indicates that these factors might be important in the formation of mutual bonds. It is quite possible that, by combining the various traits in different combinations and making a similar analysis, certain definite trends as to the importance of different trait combinations might be discovered. Further investigation along this line might prove fruitful.

6. Personality, Efficiency and Group Function

Differences in personality traits have been shown to distinguish the overchosen from the underchosen. Positive correlation coefficients found between personality traits and sociometric scores have given added evidence in support of the hypothesis that personality traits play a role in the structuring of groups. This was further substantiated by the finding that certain personality traits seem to be

connected with mutual choice. If it is found that the functioning of the groups is also connected with the extent to which certain personality traits are related to group structure, the importance of these traits of personality in the structuring of groups would be ^{better} established. In effect the question is--Are groups which are structured according to characteristics of personality better groups than those which are not? This hypothesis was investigated. The procedure followed and the results obtained from this investigation are treated in the discussion that follows.

The six groups were ranked according to the effective manner in which they ran the Home Management House, that is, how they functioned as a unit. These group ratings were made by Miss McLaughlin, the resident instructor in the Home Management House. Miss McLaughlin has supervised the Home Management House for many years and is an experienced judge. Since the students are, in any case, rated on the factors relative to this study, the validity of these ratings can hardly be questioned.

In rating the groups, the group which worked together most efficiently and most pleasantly was ranked 1st, while the next best group was ranked 2nd and so on, with the poorest group on this basis ranking 6th. The position of each of the six groups is given in Table VI.

TABLE VI

GROUP RANKINGS ON EFFECTIVENESS

<u>Group</u>	<u>Rank</u>
A	2
B	5
C	3.5
D	1
E	6
F	3.5

In examining this table, one will notice that Groups C and F received the same ranking. This was done since no clear distinction could be made between them.

Individual ratings of all the subjects on the manner in which they worked, that is, their general efficiency together with those factors of willingness and co-operation that enter into effective functioning was obtained. In addition, ratings on straight, general efficiency for all subjects, as well as specific ratings of efficiency in cooking and efficiency as Child Director, were obtained. The two latter activities, for which specific ratings were determined, had been directly referred to in the sociometric test. All individual ratings are to be found in Appendix E together with the individual results on the Guilford-Martin Personality Inventory.

It must be emphasized that group ratings of effectiveness are not arrived at by summing the efficiency of the individual members and ranking the totals from group to group. The ratings refer to the groups taken as a whole and not as the sum of their individual parts. This was confirmed by summing the individual ratings on general efficiency for each group and ranking these sums. The result was a rank order coefficient of correlation of .41

which indicates that group effectiveness was not determined by the sum of the efficiency of the individual members.

It is true, of course, that the relationship one has with other people in a work situation will determine in part the manner in which one will work. Therefore, factors such as pleasantness and co-operation that enter into individual effectiveness will affect individual efficiency.* Since this is so, one would expect a fairly high correlation between individual effectiveness and group effectiveness. This was substantiated by summing the individual marks on effectiveness, ranking them and obtaining a rank order correlation between these ranks and group ranks of effectiveness. The result was a rank order correlation of .67.

In Table III, Page 46, the coefficients of correlation obtained when the sociometric scores of the individual members of each group are correlated with their C-scores in the thirteen traits of personality are presented. Table III shows that, considering all groups and all traits, a very large majority of the r's are positive. As stated earlier, this is evidence that personality traits are related to group structure. The question now is whether or not, in those groups where personality traits are most clearly related to group structure, is there any evidence of superior group efficiency.

* General efficiency refers to pure skill in performing household tasks. Effectiveness refers to the manner in which these tasks are performed.

Of the thirteen personality traits measured, traits G, I, S and R were found to be significant factors for distinguishing between overchosen and underchosen individuals. Since these same traits also figured in the formation of strong mutual bonds, it was assumed that the extent to which these scores differentiated members in group structure might show a direct relationship to group effectiveness. If this was found to be true, added emphasis must be given to the importance of these traits in structuring groups.

To show the relationship that existed between these personality traits and sociometric score a composite score for each individual on traits G, I, S and R was determined. This was done by adding the C-scores on traits G, I, S and R for each individual giving a single combined score. These combined scores were then correlated with the sociometric scores. This was done for all six groups and the resulting correlation-coefficients are presented in Table VII.

The r's were then ranked and the relationship between these coefficients and the ranking on group effectiveness were determined by rank order correlation. The resulting rank order correlation-coefficient of .96 suggests a high degree of correspondence between group

TABLE VII

GROUP CORRELATION-COEFFICIENTS
ON COMPOSITE G, I, S, R TRAIT SCORES

<u>Group</u>	<u>Correlation -Coefficient</u>
A	.32
B	.06
C	.30
D	.68
E	-.13
F	.65

effectiveness and personality factors S, R, G and I. This means that where a group is so structured, that those who have high sociometric scores also have high scores on personality traits S, R, G and I, ^{such a group} would seem to be a more effective group than a group where this relationship is not so.

It is quite possible that certain other combinations may have similar results or very different results. Further investigations should be conducted if the exact relationship between group structure as determined by personality factors and group effectiveness is to be determined. It is quite possible that a person who scores high on certain personality traits will be efficient; that is, that a person who scores high on these personality traits will be efficient whereas a person who scores low on these personality traits will be inefficient. If this should prove to be so, it would help explain the relative effectiveness of a group. This means that, if the group is so structured that the leaders have those personality traits that account for efficiency, the group will be efficient. If, however, these qualities are only held by individuals on the opposite end of the group structure, it is not likely that the group will be efficient. One of the important aspects of leadership is the fact that the leader

usually promotes group activity and if the leader is not efficient it is unlikely that the group will be.

Now that the relationship of personality traits to group effectiveness has been indicated and its importance pointed out, the next step is to ascertain just how individual efficiency itself fits into the picture. Was an individual's efficiency an important factor in choice selection? Did its importance vary from question to question and from group to group? How is the relationship that exists in efficiency and sociometric scores connected with group effectiveness? *

In order to answer these questions, the efficiency ratings obtained were correlated with sociometric test results. Cooking ratings were correlated with the sociometric score obtained on the basis of the cooking criteria above. Child Director ratings were correlated with the sociometric score obtained on the basis of the Child Director criteria alone. The ratings on plain, general efficiency were correlated with the combined sociometric score results on Questions No. 1, 2 and 3 on the sociometric test. These questions require choices to remain within the group and refer specifically to situations directly related to the Home Management House. Individual ratings on overall effectiveness were correlated with the total sociometric

* As the sociometric test was administered at the end of the period of residence the subjects would know each other's efficiency.

score. The resulting correlation coefficients are given in Table VIII.

An interpretation of the results given on this table is necessary if a sensible picture is to be presented.

The sociometric criteria in respect to cooking asked for the selection of an assistant cook, that is, an associate who would be in an inferior position. It is, therefore, quite logical that efficiency would be a prominent factor in choice selection.

In examining the coefficients of correlation between the ratings of efficiency and the sociometric score on the cooking criteria, one can see that in four of the six groups efficiency seemed to play an important role in choice selection. Low coefficients of correlation with Groups E and F suggest that factors other than efficiency entered prominently into choice selection.

In the sociometric criteria with regard to selecting an associate who would be Child Director, the subject was placed in an inferior position and it is very probable that such personality factors that go to make a person easy to get along with, rather than efficiency, played an important role in choice selection.

TABLE VIII

CORRELATIONS OF EFFICIENCY RATINGS AND SOCIOMETRIC SCORES

<u>Group</u>	<u>Cooking and Sociometric Scores on Cooking</u>	<u>Child Director & Sociometric Scores on Child Director</u>	<u>General Efficiency and 3 Questions on Home</u>	<u>Effective Work and Total Sociometric Scores</u>
A	.50	.02	.30	.35
B	.69	.75	.31	.06
C	.66	.15	.39	.28
D	.76	.31	.62	.58
E	.13	-.04	-.31	-.05
F	.06	.08	.14	.26

Turning to the correlation coefficients obtained when efficiency as Child Director and the sociometric score on the Child Director criteria were correlated, we note that in four of the six groups the coefficients drop abruptly. In Group F, the coefficient is at a low level similar to what was found in the cooking activity correlation, while in Group B it is at a high level similar to that seen in the cooking activity correlation. In Group F, the factors which operated to make the cooking activity correlation coefficient low seem to be operating in the Child Director activity also. In Groups A, C, D and E, where the coefficients drop sharply, it is quite likely that selection was based on those personality traits that go to make a person easy to get along with rather than *with* efficiency. This observation was confirmed in subsequent interviews with a number of the subjects who were asked what factors prompted choice selection on the various criteria. Group B, however, showed a high level of relationship between choice selection and efficiency on the Child Director criteria. A knowledge of the members of this group offers a possible solution to the problem. The members of this group knew each other better than did the members of any other group. They had known each other in the majority of cases for several years before they had

even entered university. For this reason, there is in effect a more permanent structure in this group and its members know exactly where they stand in relation to each other and in general accept the existing structure. They are, therefore, very practical and realistic in choice selection. This seemingly anomalous position will be discussed more fully later on.

When the correlation coefficients resulting from the correlation of general efficiency ratings and the sociometric questions pertaining directly to the Home Management House are examined, a definite pattern is not to be found. Groups D and E show high and low correlations respectively and these two groups also stood first and last respectively in regard to group effectiveness. The coefficients do suggest that efficiency was operating together with other factors of personality to determine group structure.

Turning finally to the correlation coefficients resulting from the correlation of individual effectiveness with the total sociometric score, a definite pattern arises. The resulting coefficients vary from a high of .58 for Group D to a low of .05 for Group E. The relative rank of the individual groups shows an almost perfect correlation with the ranking on group effectiveness. The rank order correlation coefficient between these two rankings is .98.

All these results that have been discussed point to the observation that efficiency is related to group structure and that the extent to which efficiency is related to group structure determines to a large extent the way in which a group will function.

Since a similar relationship was also indicated in regard to certain personality traits, it suggests that the quality of straight efficiency and personality traits work together to determine the effectiveness of a group. It is suggested that the quality of straight efficiency be regarded as a definite personality trait even though it is not regarded as a psychological trait of personality.

A good group has been defined on the basis of the way in which it functions. It is defined as a group that works together efficiently and pleasantly and has high morale. Such groups seem to have definite leadership that is clearly focused. One measurement of such differentiation is given by the standard deviation. A high σ (standard deviation ^{of sociometric score}) indicates a focusing of leadership whereas a small sigma indicates no definite leadership. Sociometrically this would mean that where there is a low sigma in the distribution of sociometric scores, the distribution approaches chance distribution and factors affecting choice are not operating to any great

extent. Where there is a high sigma, however, it would seem to indicate that definite factors operate in regard to choice selections. In effect, this means that where there is a low sigma there would be few definite overchosen individuals and few definitely underchosen individuals; while, where there is a high sigma, these distinctions would be clear cut.

The standard deviations of the distribution of the scores of the six groups studied in this investigation are given in Table IX. *

The standard deviations listed on the following page would seem to indicate that the groups vary in the extent to which group structure or group leadership is focused. It is highly focused in Group D, the most effective group; while in Group E, the least effective group, the structure of the group is not focused to any great extent. Group B would seem to be a glaring exception to this hypothesis. This group, ranking 5th in regard to group effectiveness, ranks 2nd in regard to group differentiation. Group B, however, though well structured, is a group in which personality traits G, I, S and R, that have been found, generally, to differentiate the members of a group in accordance with group structure, are not clearly in evidence. The basis of choice selection in Group B has

* AS THE MEAN SOLIOMETRIC SCORE FOR ALL GROUPS WERE CLOSE THE COEFFICIENT OF VARIATION WAS NOT USED. MEANS RANGED FROM 12.95 FOR GROUP D TO 14.64 FOR GROUP B.

TABLE IX

STANDARD DEVIATIONS OF GROUPS ON SOCIOMETRIC SCORES

<u>Group</u>	<u>Standard Deviation</u>
A	8.06
B	8.51
C	6.80
D	8.55
E	5.68
F	7.76

seemed to be purely on the absolute meaning of the criteria rather than on spontaneous choice wishes. This might have been brought about by the fact that Group B is in effect a closed group, inasmuch as the group structure is relatively stable.

The structure in Group B has not shown a relationship to those traits of personality that seem to be important in structuring groups. Group B is not an efficient group. In Group F, while the structure shows a relationship to those personality traits, the same relationship does not exist in regard to efficiency, that is, group structure is not determined on the basis of efficiency. Group F does not rank as high in group effectiveness as one might expect from the relationship shown by its structure to personality traits. Group E is not well structured, shows no relationship whatever in regard to personality traits and group structure or in regard to efficiency and group structure. Group E is the least effective group. With Group D, however, the structure is highly focused, shows a strong relationship between sociometric score and those significant personality traits and, in addition, efficiency is clearly related to group structure. Group D is the most effective group. These observations lead one to the conclusion that, where the group structure is

stable and where a high degree of differentiation is shown, the effective functioning of the group will be determined largely by the extent to which personality factors, including the quality of efficiency structure the group.

CHAPTER V

SUMMARY AND CONCLUSIONS

I. HYPOTHESIS

The hypothesis set up for investigation has sought to show:

(a) Group structure is ^{partially} determined by the personality traits of its members.

(b) Group structure is ^{partially} determined by the efficiency of its members.

(c) When conditions described by (a) and (b) obtain the group is more effective than when they do not.

II. SUMMARY OF PROCEDURE

The procedure for attacking the problem was as follows:

(a) Eighty-four women students in the III Year of the Faculty of Home Economics (mutually) chose to form six groups of fourteen members each. These groups were formed for the basis of practical work in the Department of Home Management and Child Care, this practical work to be conducted in residence at the Home Management House for a period of one month. A sociometric test was constructed to obtain a sociometric measure of these groups.

(b) This sociometric test was administered to each of the groups toward the end of their period of residence in the Home Management House.

(c) The Guilford-Martin Personality Inventory was administered to all the subjects.

(d) To answer I (a), the subjects of all the groups were reclassified into three groups--average, overchosen and underchosen--on the basis of their sociometric scores and the mean score of each class on the thirteen personality traits measured by the Guilford-Martin Personality Inventory determined and the resulting means for each class were compared from class to class.

(e) The chi-square technique was applied to the score distributions of the three classes.

(f) Correlations were made between the scores on the thirteen personality traits and the scores on the sociometric test for all six groups.

(g) Degree of similarity in the thirteen personality traits between mutual pairs and between unrelated pairs was determined.

(h) The distributions of mutual pairs and chance pairs and the distributions of unrelated pairs and chance pairs were tested by the chi-square technique.

(i) To answer I (b), individual rankings on general efficiency, efficiency in cooking, efficiency as Child Director and overall ratings of each individual on effective functioning were obtained and these results were correlated with the results obtained from the sociometric criteria.

(j) To answer I (c), the six groups were ranked on the basis of effective functioning as a group and the results compared with group structure as related to personality traits and group structure as related to efficiency.

III. CONCLUSIONS

The conclusions that can be made on the basis of this investigation are as follows:

(a) The overchosen group are superior in mean score to the mean score ^{of the} underchosen group ^{with respect to the} personality traits measured with the exception of trait Ag (Agreeableness). In four traits, S, R, G and I, the difference is statistically significant.

(b) The overchosen group differs significantly from the underchosen group in the frequency of the personality scores which appear within the range of scores most desirable for mental health.

(c) The mean score of the average group differs

from the mean score of the underchosen group in all thirteen traits, the difference indicating more favorable scores for the average group. In one trait, D (depression), the difference is statistically significant.

(d) No consistent picture of the differences in personality traits between the average and the overchosen group can be made without further investigation.

(e) On the whole, the thirteen traits all show a positive correlation with sociometric score; the differences in size of correlation coefficients between groups seems to be related in some way to group effectiveness.

(f) When individuals rather than scores are considered, the use of chi-square shows significant differences, in the distribution of the scores between overchosen and underchosen groups, in each of the traits, S, R and G.

(g) Mutual pairs when compared to unrelated pairs show significantly greater similarity in regard to personality traits G and R. The trend is toward somewhat greater similarity in personality traits than is found in chance combination of pairs.

(h) Efficiency plays as great a role in the structuring of ^{our} groups as conventional ⁱⁿ personality traits.

(i) Personality traits and efficiency may be related.

(j) Within the limits of these six groups, the extent to which the leadership of a group is focused is closely related to group effectiveness.

(k) The effectiveness of a group shows a definite relation not only to the extent to which the leadership is focused but also to the degree in which the group structure is related to personality traits including efficiency.

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APPENDIX A

GLOSSARY

- associate - person whom one would like to have share an experience.
- bond - refers to the relationship existing between individuals as a result of sociometric choice.
- isolate - term used to describe a person who is not chosen by any of the members of the group to which he or she belongs and who in many cases may be rejected by the members of the group.
- mutuals - refers to two individuals who choose each other on certain sociometric criteria. In this study strong mutuals are defined as instances where one individual chooses another in at least three of the five sociometric criteria and is herself chosen by this individual in at least two of the five sociometric criteria.
- overchosen individual - term used in this study in preference to "star". It refers to any member of a group who receives choices in excess of what might be expected at a chance level of .02.
- scattergram - scoring chart used to indicate the choices given by the members of a specific group to each other on the sociometric test.
- sociogram - target diagram used to show group structure. Consists of four concentric circles the boundaries of which are statistically derived. Individuals are plotted on target so that the person receiving many choices is placed near the center while those receiving few choices are placed at periphery.
- sociometric criteria - questions on sociometric test. These questions refer to specific situations which have a definite and real meaning for all the members of the group.

- sociometric score - number of choices an individual receives on the sociometric test.
- star - term used to designate a person who receives an unusually large number of choices from the members of the group to which he or she belongs.
- underchosen individual - term used in this study in preference to "isolate". Since the groups here are to a large extent sociometrically arranged no true isolate would be found. Individuals who receive choices less than what might be expected at a chance level of .02 are designated as underchosen.
- unreciprocated pairs situation in which one individual chooses another but is not chosen by that person in return.
- unrelated pairs - situation in which two individuals do not choose each other on any criteria.

APPENDIX B
 SOCIOMETRIC TEST

This is a questionnaire to discover something of the dynamics of social groups. The information received will be strictly confidential.

Please answer the following questions.

1. Suppose you were to spend another month at the Home Management House. Which members from your present group would you most like to have with you?

1st choice _____ 2nd choice _____
 3rd choice _____.

2. If you were acting as First Cook who would you most like to have as Second Cook?

1st choice _____ 2nd choice _____
 3rd choice _____.

3. If you were Assistant Child Director who would you prefer to have as Child Director?

4. Who would you prefer to have accompany you on a double-date to a special social affair? You may include any members from the entire III Year Home Ec. Class.

1st choice _____ 2nd choice _____
 3rd choice _____.

5. Name in preference 3 girls with whom you would like to participate in some extra-curricular class activity.

1. _____ 2. _____

3. _____.

APPENDIX C

DISCRIPTION OF FACTORS COVERED BY GUILFORD-MARTIN INVENTORIES

- S - Social Introversion - Extraversion. - Shyness, seclusiveness, tendency to withdraw from social contacts, versus sociability, tendency to seek contacts and to enjoy the company of others.
- T - Thinking Introversion - Extraversion. - An inclination to meditative or reflective thinking, philosophizing, analysis of one's self and others, versus an extravertive orientation of thinking.
- D - Depression. - Habitually gloomy, pessimistic mood, with feelings of guilt and unworthiness, versus cheerfulness and optimism.
- C - Cycloid disposition. - Strong emotional fluctuations, tendencies toward flightiness and emotional instability, versus uniformity and stability of moods, evenness of disposition.
- R - Rhythymia. - A happy-go-lucky, carefree disposition, liveliness, impulsiveness, versus an inhibited, over-controlled, conscientious, serious-minded disposition.
- G - General pressure for overt activity.
- A - Ascendency in social situations as opposed to submissiveness; leadership qualities.
- M - Masculinity of attitudes and interests as opposed to femininity.

- I - Lack of inferiority feelings self-confidence.
- N - Lack of nervous tenseness and irritability.
- O - Objectivity (as opposed to personal reference or a tendency to take things personally).
- Ag - Agreeableness (as opposed to belligerence or a dominating disposition and an overreadiness to fight over trifles).
- Co - Cooperativeness (as opposed to faultfinding, over criticalness of people and things and an intolerant attitude).

APPENDIX D I

GROUP A SCORING CHART

SUBJECT	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345
A	-	1 1 1 0 0	1 00 00	1 0000	1 0 000	00100	01001	1 1 000	00000	00000	1 00 00	00000	1 0000	000 0
B	1 1 1 00	-	00000	1 1 0 11	00000	0 0 0	1 1 1 10	00000	00000	00000	00000	00000	00000	11 000
C	00100	00000	-	1 0 000	1 0000	1 010 0	1 00 00	10001	1 000	00000	1 1 000 0	00000	1 00 00	00000
D	1 0 000	1 00 0	00001	-	00000	101 0	00 00	100	0 000	00000	00000	00000	00000	1 0000
E	1 1 011	00000	00000	1 00 00	-	1 01 0	1 0 000	00000	1 1 000	00000	00100	00000	1 11 00	00000
F	1 0 00	11 11 0	01000	10111	00000	-	1 1 000	1 00 00	00000	00000	00000	00000	00000	1 000 0
G	1 1100	1 1 0 0	00000	00000	00000	00000	-	1 10 01	00000	00000	1 11 00	00000	00000	00000
H	11 00 0	00000	1 100	1 00000	00 00	00000	1 100	-	1 0001	0 000	1 0100	00000	00000	00000
I	01000	0000	00000	1 00 00	1 0000	1 001 0	1 0 000	00001	-	0000	1 00 00	1 0 000	1 100	00000
J	11 11	00000	00000	00000	00000	00000	11 0 00	00001	111 10	-	00000	1 1000	00000	00000
K	1 0 100	00000	1 10 10	00000	1 010	11 00 0	1 0001	1 1 000	00000	00000	-	00000	00000	00000
L	1 0 00	00000	10000	00000	1 0 000	00 00	00000	1 000	1 1 010 0	0000	1 1 00110	-	00000	00000
M	1 1 1 1 0	00000	00000	00000	1 0 0	1 0 000	1 0 000	00000	10011	00000	00100	00000	-	00000
N	1 0 100	00010	00000	1 1 00 1	1 0 000	1 10 01	1 000	00000	01000	00000	00000	00000	00000	-
	11 42 5 10	23144	31222	31434	24213	24752	57605	62208	54134	21000	22621	12000	30122	10031
	32	14	10	15	12	20	23	18	17	3	13	3	8	5

N. B. Figure 1 on line even with the row formed by a subject's name refers to a first choice. A figure 1 on the line immediately above refers to a second choice while a figure 1 on the second line above refers to a third choice.

APPENDIX D 2

GROUP B SCORING CHART

SUBJECT	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345
A	-	1 00 00	00000	00000	01000	00000	001	00000	0010	0 000	1 1 1 0	00000	00 0	00001
B	1 0 000	-	00000	000	00000	00000	10111	000 0	0 00	00000	00000	01 00	00000	1 1 00
C	00000	00000	-	000 0	00000	00000	1 0 1	00 00	00000	1 0000	1 00	0 000	00100	0000
D	00000	1 0000	00000	-	00000	1 00	000	00100	00000	1 00	11	00000	00011	1 1 0 0
E	00000	00000	00000	00000	-	0000	0011	000	11	000 1	0 100	00 00	00000	00000
F	00000	00000	00000	00000	0 00	-	00000	00000	0 01	00000	11 1 00	00100	00000	1101
G	10000	00000	00010	00000	0 101	00000	=	00000	00000	0 000	1 1 00 0	1 0	00 00	0000
H	00000	00000	00000	00000	01 00	00000	1 11 00	-	11111	00000	10111	00000	00000	00000
I	00010	00000	00000	00000	1 000	0000	000 0	010	-	00000	01 00	00 00	00000	1 1 0 1
J	00000	1 1 000	00000	1 1 00 0	0110	00000	10010	0 00	00000	-	0 001	00 00	000 0	00000
K	1 000	1 00000	00000	00000	010 0	10001	00000	0 100	00000	00000	00-00	00100	00000	00 10
L	0000	1 00000	1 000 0	1 1 00010	1 1000	00000	101 0	1 1 00	11	0 00	00000	0000	-	00000
M	1 0 100	1 000 0	1 10 00	1 1 10 1	00000	00000	1 01	00000	00000	0 000	0000	00000	-	00000
N	0000	1 00000	00000	00000	0 000	10110	0 0	00000	1 1 10 1	00000	1 1 0 00	0000	00000	-
	22113	20111	10030	30142	29412	31213	934 7 11	34612	46635	24110	57524	23824	11231	32147
	9	5	4	10	18	10	34	16	24	8	23	19	8	17

APPENDIX D 4

GROUP D SCORING CHART

SUBJECT	A 12345	B 12345	C 12345	D 12345	E 12345	F 12345	G 12345	H 12345	I 12345	J 12345	K 12345	L 12345	M 12345	N 12345
A	-	10011	00000	1 1 0 00	00000	00000	00000	1 0 00	1 0 000	00000	00000	1 0 000	10 00 0	1 1 110
B	1 00 00	-	00000	1 1 0 1	00000	1 000	00000	1 1 0 0	1 00000	00000	00000	00000	00000	1 111 1
C	00000	00000	-	1 1 1 0 0	00100	00000	1 00 00	1 0 000	00000	1 1 1 0	00000	1 0000	00000	00000
D	00000	1 0000	1 000 0	-	00000	1 00 00	00000	1 0000	00000	1 0000	1 010 0	1 0 00	1 00 00	1 1 100
E	00000	00000	00000	1 11 1 0	-	1 1 01 0	1 0000	1 00000	1 0 000	1 10 10	1 0000	00000	00000	1 0 000
F	1 0000	1 0000	1 00 00	1 11000	1 0 000	-	00000	00000	1 0 000	1 00001	1 0000	1 0000	1 00100	1 00 00
G	00000	00000	00000	1 0 00	1 1 00 0	00000	-	1 0010	1 01 00	1 011	00000	00000	11 100	00000
H	00000	00000	0000	1 10100	1 0 00	1 01000	1 00 00	-	00000	1 0 000	00000	00000	00000	1 00 0
I	10100	00000	00000	1 01000	1 0 000	1 0001	00000	1 0010	-	1 00 00	00000	1 00000	00000	1 00 00
J	00000	00000	1 00	1 1 1 11	1 01100	1 0000	00000	1 0000	00000	-	1 000 0	00000	00000	11 0 00
K	1 00 00	1 000 0	00000	1 1 1 0 0	1 00100	1 1 100	00000	1 00 01	00000	00000	-	1 1 000	1 0 000	1 00000
L	00000	0000	1 1 1 0	1 1101	00000	00000	00000	1 1 00 0	00000	1 0 000	1 00 00	-	00000	00000
M	00000	00000	00000	1 1 110	1 00	10 00000	000 0	1 0 00	1 01 00	1 0000	00000	1 0000	-	00000
N	1 0101	1 1 1 0 0	00000	1 0100	00000	1 0 000	00000	1 10000	00000	11 0 00	00000	00000	00000	-
				10										
	30401	40123	31222	10 864	24420	54212	00211	43335	05200	45423	01122	23004	11311	45622
	8	10	10	38	12	14	4	18	7	18	6	9	7	19

APPENDIX D 5

GROUP E SCORING CHART

SUBJECT	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345	12345
A	-	00000	00 00	1 1 1 0	1 10000	00000	0 100	00000	00000	00000	00000	1 1 000	00000	00000
B	00000	-	00000	1 0100	1 00 0	1 0 000	00000	00000	00000	1 000 0	00000	1 0000	11 0 00	11011
C	00000	00000	-	1 00 00	1 1 1	1 1 11	00000	00100	00000	1 0000	00000	00000	01000	0000
D	11011	0000	1 0 000	-	1 0 0	00000	00100	00000	00000	00000	00000	1 1 000	1 0 000	1 00 00
E	1 1 1 1	00000	1 0 000	1 00 00	-	00000	00000	00000	00000	00000	00000	1 0000	00000	1 1 11 0
F	00000	1 0 000	1 10 11	1 0000	11 100	-	00000	0000	00000	0000	1 00000	00000	11 01 0	00000
G	01000	1 000 0	00000	1 0100	1 0000	1 00 00	-	1 1 0 0	1 1 010	00001	00000	00000	1 0 00	00000
H	00000	1 0000	1 0 10	1 00100	1 00 00	00000	1 100	-	1 0 000	10001	00000	00000	1 0 000	1 000 0
I	1 0 01	1 000 0	1 0 100	1 00010	1 1 000	00000	1 1 00	1 000 0	-	00000	00000	00000	1 0100	00000
J	00000	00000	1 0110	1 00000	1 000 0	1 0 000	1 00 00	1 000	1 0 000	-	00000	00000	1 11 0	00000
K	00000	00000	11 1 0 0	1 0 00	00000	00000	1 01 00	10100	00000	00000	-	00000	1 0 000	00000
L	00000	1 100	1 0 000	1 01 0	1 10 11	00000	1 00 00	00000	00000	00000	1 000 0	-	1 1 00000	1 1 0 00
M	1 00 00	00000	1 0000	1 00100	00000	11 001	00000	00000	01000	111 10	00000	1 0 000	-	11 000
N	00000	1 1 011	01000	00100	00000	00000	00000	00000	00 00	1 0000	1 00 00	1 0000	1 1 000	-
	33323	23034	56541	61 21 10	62535	24212	24601	30322	14110	30125	00110	52001	2 322 10	23244
	14	12	21	20	21	11	13	10	7	11	2	8	19	15

EFFICIENCY RATINGS AND PERSONALITY SCORES - GROUP A

SUBJECT	Cooking	Child Director	EFFICIENCY RATINGS		Standing	PERSONALITY SCORES												
			General	Efficiency		G	A	M	I	N	S	T	D	C	R	O	A	e
A	10	9	10	88	5	3	4	4	5	4	4	6	5	5	3	5	8	
B	8	9	8	78	7	6	4	6	3	8	6	6	6	7	6	5	y6	
C	9	10	10	87	4	6	6	8	10	6	5	9	9	5	10	8	10	
D	7	6	6	70	4	7	8	4	4	8	5	6	4	9	5	4	7	
E	7	8	8	80	1	2	4	2	4	0	5	2	3	3	2	4	3	
F	9	10	9	86	5	4	1	6	5	6	4	5	4	5	5	7	9	
G	8	9	8	80	6	3	4	5	4	5	4	4	4	6	6	2	4	
H	7	8	7	76	4	7	4	4	5	6	6	6	5	7	4	4	5	
I	9	9	9	80	2	6	4	3	3	2	5	6	5	4	6	4	5	
J	8	7	8	78	2	1	4	2	6	1	3	3	4	2	6	6	6	
K	9	8	8	80	7	5	4	6	5	9	7	8	8	6	10	8	9	
L	8	8	8	79	5	5	4	3	4	5	5	6	5	4	3	4	4	
M	8	9	8	81	3	1	4	2	6	3	5	4	3	4	3	5	5	
N	7	8	7	76	3	4	3	3	4	4	5	3	3	5	4	4	5	

APPENDIX E2

SUBJECT	EFFICIENCY RATINGS AND PERSONALITY SCORES - GROUP B																	
	EFFICIENCY RATINGS					PERSONALITY SCORES												
	Cooking	Child Director	General Efficiency	Standing		G	A	M	I	N	S	T	D	C	R	O	Ag	Co
A	6	6	6	67		4	3	6	4	6	3	5	4	5	5	6	8	7
B	9	9	10	82		2	4	6	4	6	4	7	7	7	3	5	6	6
C	7	8	7	72		6	7	3	6	3	6	4	4	4	7	5	4	5
D	6	7	6	70		6	7	3	5	5	4	3	4	4	4	5	5	6
E	7	8	7	73		3	5	4	5	5	7	6	7	8	4	8	6	8
F	8	7	8	78		4	5	3	5	3	5	4	5	5	5	4	5	5
G	10	10	9	82		3	6	5	7	7	8	8	7	7	6	7	8	8
H	7	8	7	77		4	7	2	1	1	5	4	3	2	5	3	2	5
I	9	10	8	83		0	1	4	2	4	1	1	1	2	4	4	6	5
J	8	9	8	80		2	3	0	4	5	3	7	5	5	6	3	5	5
K	8	9	9	81		5	3	4	4	5	7	4	7	5	6	4	7	5
L	7	8	8	79		3	1	3	5	6	3	8	6	7	6	6	7	7
M	6	6	6	65		6	4	4	3	3	5	6	4	4	5	4	6	5
N	8	7	8	79		6	6	6	4	4	5	4	4	4	5	5	5	8

APPENDIX E3

SUBJECT	EFFICIENCY RATINGS AND PERSONALITY SCORES - GROUP C																			
	EFFICIENCY RATINGS					PERSONALITY SCORES														
	Cooking	Child Director	General Efficiency	Standing		G	A	M	I	N	S	T	D	C	R	O	A	g	C	o
A	7	8	7	74		4	3	4	3	4	5	6	6	5	7	6	6	5		
B	8	9	9	83		1	1	2	4	5	4	8	7	7	4	5	4	6		
C	8	9	9	82		0	4	5	6	5	6	9	8	9	4	5	7	7		
D	8	10	9	83		3	4	4	8	10	4	6	8	9	5	6	7	7		
E	10	10	9	84		5	7	3	7	8	6	4	8	8	5	5	6	2		
F	9	7	8	82		3	5	4	9	10	5	5	8	9	4	5	5	5		
G	10	9	10	85		7	5	5	4	4	5	4	4	4	5	5	5	6		
H	7	7	7	74		3	4	3	2	2	3	5	3	3	5	3	4	6		
I	7	8	7	76		6	4	4	2	3	5	8	7	7	6	6	4	3		
J	8	9	8	79		6	3	0	1	5	4	7	4	4	4	2	6	3		
K	8	8	9	80		5	5	2	4	2	4	6	4	4	5	2	1	2		
L	7	8	8	79		3	4	4	4	6	3	4	4	5	3	4	5	4		
M	7	8	9	76		6	5	2	2	3	6	4	4	4	5	3	4	4		
N	8	8	8	77		6	4	1	3	4	6	6	6	5	8	4	6	4		

APPENDIX E4

EFFICIENCY RATINGS AND PERSONALITY SCORES / GROUP D

SUBJECT	Cooking	EFFICIENCY RATINGS			Standing	G A M I N	PERSONALITY SCORES											
		Child Director	General	Efficiency			S	T	D	C	R	O	A	g	C			
A	8	9	8	8	80	1	3	5	4	5	3	4	4	4	3	3	6	6
B	8	9	8	8	80	5	6	5	7	7	9	6	9	8	7	7	5	8
C	8	8	7	7	78	4	1	0	2	6	3	4	5	5	3	5	8	8
D	10	9	9	9	83	6	8	5	8	7	9	4	8	8	7	7	6	6
E	8	9	8	8	77	3	5	4	6	9	6	6	9	9	6	7	6	5
F	9	9	8	8	80	7	3	4	4	4	4	5	3	3	6	3	5	5
G	8	8	8	8	76	1	0	0	1	1	2	3	2	3	2	3	3	4
H	8	8	8	8	77	7	8	4	6	4	8	5	6	7	6	4	4	5
I	8	9	8	8	79	4	2	6	4	8	1	5	6	7	2	8	7	5
J	8	8	8	8	77	7	8	5	5	6	6	6	5	5	6	5	6	7
K	7	8	7	7	73	4	4	4	6	6	5	4	6	7	3	5	6	4
L	8	9	8	8	80	4	7	0	6	5	5	4	5	5	6	5	5	6
M	7	8	7	7	75	3	2	5	2	2	3	3	4	2	4	6	7	7
N	8	10	10	10	82	6	6	5	7	10	8	7	8	8	7	8	8	6

APPENDIX E5

EFFICIENCY RATINGS AND PERSONALITY SCORES - GROUP E

SUBJECT	EFFICIENCY RATINGS			Standing	PERSONALITY SCORES													
	Cooking	Child Director	General Efficiency		G	A	M	I	N	S	T	D	C	R	O	A	G	C
A	8	8	8	75	2	3	0	3	4	5	5	6	7	3	5	5	4	
B	7	8	8	76	2	4	6	6	6	5	5	7	7	5	8	7	8	
C	6	7	6	67	4	5	2	4	5	6	4	4	3	6	6	1	5	
D	7	8	7	73	1	2	3	4	5	2	7	6	8	4	8	8	7	
E	7	8	8	74	5	4	4	3	5	5	4	5	4	6	5	7	6	
F	7	7	7	68	4	2	5	5	6	2	9	6	7	5	7	2	5	
G	9	10	8	82	7	7	6	5	5	8	5	7	6	7	8	4	5	
H	6	6	7	67	8	5	6	4	4	5	2	4	3	7	5	6	8	
I	10	10	10	84	6	3	4	5	2	4	5	3	3	7	2	5	4	
J	9	10	10	82	8	7	6	6	5	5	5	7	6	7	8	5	7	
K	7	8	8	70	4	3	4	4	6	5	7	6	6	5	5	8	7	
L	7	8	7	72	3	3	3	3	4	3	6	4	4	5	5	4	7	
M	8	9	9	80	4	4	6	5	5	4	6	6	6	6	7	5	5	
N	6	7	7	68	2	6	4	7	8	6	4	9	7	5	6	7	7	

APPENDIX E6

EFFICIENCY RATINGS AND PERSONALITY SCORES - GROUP F

SUBJECT	EFFICIENCY RATINGS			Standing	PERSONALITY SCORES													
	Cooking	Child Director	General Efficiency		G	A	M	I	N	S	T	D	C	R	O	A	g	Co
A	9	8	8	80	5	7	4	6	6	5	5	5	5	5	6	6	5	6
B	8	9	8	79	5	6	3	6	3	8	4	5	5	6	2	3	4	
C	9	9	9	80	1	2	5	3	6	3	4	4	4	5	6	4	5	
D	9	9	9	81	7	8	3	8	6	8	6	7	7	7	6	4	5	
E	10	10	9	84	7	7	2	5	3	8	3	4	3	7	4	4	4	
F	9	10	10	84	3	5	0	7	6	5	5	6	7	4	8	8	6	
G	7	8	7	71	3	4	4	4	5	3	4	4	5	4	6	6	7	
H	9	10	9	83	5	7	3	6	7	8	6	7	7	7	5	5	5	
I	8	9	9	80	8	7	4	4	3	8	5	4	3	8	4	3	5	
J	9	9	9	81	7	7	5	7	4	9	7	7	5	9	4	3	5	
K	7	8	8	77	2	5	4	3	4	3	2	3	4	3	5	5	5	
L	7	8	8	75	2	4	4	2	3	5	3	2	2	7	4	5	5	
M	10	10	10	83	0	2	4	6	6	3	6	6	8	3	7	8	9	
N	7	8	8	78	4	7	5	6	6	7	4	8	8	6	8	7	5	