

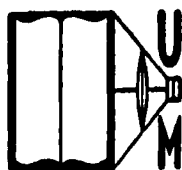
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TITLE EFFECTS OF VARIATION IN
LEADERSHIP ON PARTICIPANT
BEHAVIOR IN DISCUSSION GROUPS

AUTHOR ROGER W. HEYNS

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**EFFECTS OF
VARIATION IN LEADERSHIP
ON
PARTICIPANT BEHAVIOR IN DISCUSSION GROUPS**

By

Roger W. Heyns

**A Dissertation Submitted in Partial Fulfillment of
the Requirements for the Degree of Doctor of
Philosophy in the University of Michigan**

December, 1948

**Committee in Charge:
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Since the experiment was conducted in a team-research setting many people cooperated in the study. The theoretical framework for the experiment was developed by a group composed of Drs. Harold Guetzkow, Donald G. Marquis, Theodore M. Newcomb, Alvin Zander and the writer. Berenice Eastman interviewed the experimental subjects. Howard Birdsall, Leroy Burwen, Ellen Chenin, Kamle Chowdhry, James Crow, Merigan Heilman, Edd Miller, Jack Peterman, Georgia Riley, Florine Schiff, Robert Scott, Harry Shelley and Toyooki Yamada assisted in the analysis of data. Kathleen Denise and Lola Reagan coded the problem-solving behavior of the participants. Dr. Guetzkow and Joseph Bassett developed the criterion solution to the conference problem. Jeanne Wheeler, Harry Levin, Gloria Parsons and Noma Christian helped with preparation of the manuscript. I am deeply grateful to all of these people for their assistance.

I appreciate the interest of the members of my committee and their willingness to tackle the problems which arise when an experiment executed in a team-research setting is submitted as a dissertation. I am especially indebted to Dr. Guetzkow and Dr. Marquis for their criticisms and advice.

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THEORETICAL FRAMEWORK

The experiment described in this report was the first in a series of researches on the administrative decision-making conference. It was designed to accomplish two purposes, one methodological and the other theoretical. The experiment included a wide variety of psychological techniques with the intention of providing methodological information for use in subsequent studies. It also provided opportunity for preliminary testing of promising hypotheses to assist in theory revision and development.

The theoretical framework for this experiment developed in a long series of conferences by the staff of Conference Research, supplemented by consultants from the University of Michigan faculty and elsewhere. Concomitantly a systematic survey of the literature was carried out, the results of which were used in these theory-development conferences.

The basic approach in the development of the theory was to establish at the outset those effects or results of a conference in which the research group was interested. There are a large number of outcomes of any conference and the experimenter must decide with which products he will concern himself. This approach is in contrast to a research program concerned primarily with the relationships among variables operating during a conference or to one studying the relationship of variables operating prior to the conference to those operating during the conference. The research team decided to concern themselves with two types of outcomes: the group decision(s) of the conference and the effects upon the participants, such as their satisfaction with the decision and their motivation to

execute it.

The next step was to organize the variables which on theoretical grounds are related to these outcomes. One system of classification is based upon the time at which the variable is primarily operative. Some variables, such as status position of the individuals and the relations among participants prior to the conference, are introduced into the conference setting long before the meeting begins. They influence the final outcomes through their effects on variables which are operating during the conference itself. The variables which exist prior to the conference are designated as "pre-conference variables". There are others which are operative during the conference itself. These are referred to as "process variables".

Within the class of process variables, another distinction is made on the basis of the causal relationship between the variable and the outcomes. Some variables, on theoretical grounds, are directly related to conference outcomes; others modify conference outcomes indirectly, by mediation through other process variables. A variable of the first type is referred to as a direct determinant. The direct determinants have been arranged into three sub-groups, (1) interpersonal variables, (2) problem-solving process variables, and (3) communication variables. The second type of process variable is called an indirect determinant variable. An illustration of the latter type is the kind of leadership used in a conference. It does not operate immediately on the outcome but affects among other things, the way the group attempts to solve the problem. It is the problem-solving behavior which directly affects the outcome. This distinction between direct and indirect determinants was a crucial one in the selection of process variables for intensive investigation.

I. Outcome Variables

The results of the conference may be divided into two types: the group decisions themselves, and the changes induced in the participants by the conference process.

A. Group Decisions

The quality of the decision is the fundamental criterion. Quality of decisions on problems without definite solutions may be rated by experts. It can be measured by the degree to which the group's decision exceeds in quality the solutions of individual participants prior to the conference. On those decisions which result in definite action a short time after the conference, a follow-up study might be made of the number of appeals against the decision, the degree of modification necessary to execute the decision and the degree to which it improved efficiency of operations.

Of the many possible effects of conferences on participants, two require particular mention in connection with the experiment to be described: Participant satisfaction with decision and participant satisfaction with process. The participant's general satisfaction with the decision may depend upon such factors as his judgment of the quality of the decision and the degree to which the decision achieves his goals. In many cases, especially in those cases in which there is no external criterion of quality to apply to the decision, this becomes the only one by means of which to evaluate decision adequacy.

By satisfaction with conference process is meant the satisfactions arising from the mere fact of meeting together, from the insights obtained through creative group thinking. Operationally this satisfaction would be

best measured by evidence of willingness to come back for another meeting. The theory holds there is no necessary correlation between these two outcome measures.

II. Direct Determinants

Three classes of direct determinants were posited: A. interpersonal variables, B. problem-solving, and C. communication. Certain of the direct determinants affect only one or two of the outcome variables; others might affect all outcomes.

A. Interpersonal Variables

Conference outcomes are believed to be directly affected by aspects of the interpersonal relations among the members. The theoretical framework for this experiment posited three aspects of interpersonal relations as being of particular importance in determining outcomes. These three are: congruence of goals, interdependence of members and personal liking among members.

It is assumed that the member of a group who perceives that other members share his goals has a greater force operating on him to keep him in the group than a person who perceives his colleagues as differing with him as to goals. It is necessary to recognize that there are different levels of goals. One may refer to problem oriented goals of the individuals or to sustained goals derived from enduring values and needs of the participants. The first meaning is referred to as "immediate objectives"; the last meaning is designated, "general values". The hypothesis would be, however, that both perceived congruence as to solution objectives and as to general

values would operate directly on outcomes. Groups whose members perceive each other as working toward the same immediate goals and ultimate value goals will be more satisfied with group products than groups whose members perceive each other as in conflict on goals, or values.

The second dimension, interdependence of members, refers to the extent to which the members feel they need each other to attain objectives. The degree to which the perception of interdependence, or need, is present, is directly related to such outcomes as satisfaction with decision and satisfaction with process.

The third dimension, personal liking, is concerned with the extent to which there are attractions arising from the personal, affective interrelations existing among the members. Groups whose members like each other personally will be more satisfied with their decisions than groups whose members dislike one another.

The concept of cohesiveness may be used as a way of interrelating the interpersonal variables. The term cohesiveness is defined as the degree to which the members of the group belong to the group. Put another way, cohesiveness is a resultant of the forces keeping the members of a group together. Theoretically, it is possible to measure the cohesiveness of a group by determining the extent to which the members actively resist removal from the group, and by ascertaining the degree to which the individuals felt they belonged to the group.

In terms of measurement techniques, cohesiveness is analogous to the concept of motivation in individual psychology. Hunger, for instance, can be measured by asking the respondent to verbalize his degree of hunger in some quantifiable way, or by using some quantifiable barrier which the

individual will overcome to attain the goal object. Although in this study, it was not possible to use the barrier approach, it was possible to estimate the group's cohesion by asking each participant to rate the degree to which he felt he belonged to the group.

The three interpersonal variables represent dimensions on which the attractiveness of a group for an individual can vary. For example, one of the forces which keeps a person in a group is personal liking for its members; another is the need for the assistance of others in arriving at a goal. Thus, in measuring the degree to which the members of a group are attracted to each other personally, one is measuring the degree to which the group is cohesive on that dimension. After positing a number of such dimensions, one is led to assume that groups which score high on all such dimensions are more cohesive than groups which score low. Ascertaining the resultant cohesiveness which occurs when there are various degrees of cohesion and disruption exhibited on the various dimensions is most difficult. A single index of cohesiveness for the group demands the determination of how each component is to be weighted. This problem also has its analogue in the field of individual motivation: how do thirst and hunger summate in driving the animal over the electric-grill barrier?

In individual psychology, some indirect measures of motivation are also generators of the motivational state. For instance, the number of hours of food deprivation, sometimes used as a measure of strength of the hunger drive, is also a generator of that drive. Analogously, the dimensions of interpersonal relations may be thought to be generators of cohesiveness. The more the individuals in a group like each other personally, for example, the greater the cohesiveness, i.e., the more the members belong to the group.

Interpersonal variables are not the only ones which generate cohesiveness, of course. A communication variable, such as the degree to which the participants understand what is being said, will affect the extent to which they belong. At the same time, as with the interpersonal variables, it is a dimension along which the attractiveness of the group may vary for the individual. Cohesiveness is thus, in terms of the theoretical framework, a resultant product of all the process variables: interpersonal, problem-solving, and communication. At the same time, these process variables may be used as measures of cohesiveness. Because the interpersonal determinants are thought to be the more significant generators of group cohesiveness, cohesion will be discussed almost entirely in the framework of the interpersonal variables.

B. Problem Solving

The quality of the decision will be affected by the way the group carries through the problem-solving process. A classification of functional responses, such as solution-proposing, supporting, opposing and summarizing, was used to describe the problem-solving process. This system of categories was developed in preliminary experimentation.

Which patterning of these categories will indicate high problem-solving skill and which indicates inadequacy must be determined. It seems reasonable to suppose that the amount of summarizing done will affect the participants' satisfaction with process. The percentage of non-problem directed responses might be directly related to the quality of decision. Further, certain sequences of the response classifications may directly determine outcomes; for instance, the occurrence of solution-proposing before

problem-proposing responses may result in lowering the quality of decision. Lastly, ratio patterns may influence outcomes: a high ratio of supporting to opposing responses may increase the participants' satisfaction with the group process.

C. Communication

The effectiveness with which the members of the group transmit ideas and feelings to each other will directly affect such outcome variables as quality of decision and satisfaction with decision. The communication variables can be classified under two general categories, delivery and content. Included in the delivery category are such variables as volume, pronunciation, articulation, variety/monotony and quality of speaking. The content category refers to variables such as length and kind of sentences, repetition, level of abstractness of words and directness of contact with hearers.

III. Summary

The purpose of this discussion has been to provide a general theoretical framework for this experiment. Basically, the theory posits direct relationships between the quality of the decision and participant satisfaction with decision and three classes of process variables: interpersonal, problem solving and communication. Specific hypotheses as to interrelations among process variables which were a part of the pre-experiment theorizing will be discussed in the body of the report.

EXPERIMENTAL DESIGN AND PROCEDURE

Four groups of students in an undergraduate course in the psychology of management discussed an industrial relations problem in an hour-long conference. The leader was a psychology professor not generally known by the participants. The leadership style was varied in an attempt to produce differences in the problem-solving process, in interpersonal relations, and in the communication process. Data in each of the areas of conference process were obtained from wire recordings, observers' records, and questionnaires administered to the participants.

I. Experimental Design

The best preliminary test of the general theory that the outcomes of a conference were directly related to interpersonal, problem-solving and communication variables would be provided by groups which showed a considerable range of scores on these variables. Three possible methods of obtaining a range of scores were considered: (1) random selection of participants producing normal variation; (2) systematic variation of groups on pre-conference characteristics of participants believed to be related to process variables, such as age, sex, intelligence, and attitudes; (3) matched groups on pre-conference variables and manipulation of a process variable, which on theoretical grounds would produce differences between groups. The first method was rejected because of the risk that random selection might not produce the range of scores necessary. The second was rejected because the theory was not sufficiently developed to permit hypotheses on the effect of pre-conference variables on process. In addition, there was the possibility that the pre-conference variables might work in opposite directions, resulting

in no range of scores. The third method was used. Two styles of leadership were devised which on theoretical grounds would have opposite effects on communication, problem solving and interpersonal relations. Each leadership style was used with two groups.

Each conference was limited to one hour. Each conference group had either nine or ten participants. The same problem was given to each group to solve. The groups were matched on age, veteran status, year in school, grade-point average, social fraternity affiliation and previous experience in group discussion. Measures during the experiment also indicated that the groups were matched in the quality of their pre-conference solutions. There were also no significant differences among groups in the amount of pre-conference acquaintanceship among members.

A. Leadership Styles

Style One, the positive style, was used in Conferences 1 and 4. The leader was instructed to facilitate communication by recognizing the presence of misunderstanding and work toward a group effort at clarification. The leader was instructed to create a feeling of belonging to the group by frequent reference to the group as a group and by accepting himself the contributions of participants. He was to try to bring about agreement on goals by minimizing conflicts on purposes and emphasizing the areas of agreement and was instructed to emphasize the need the group had for the various participants by commenting on the value of individual contributions. He was instructed to stimulate personal liking among the members by pointing out instances of support and minimizing rejections and by using peoples' names. The leader was told to improve the efficiency of the problem-solving

process by summarizing, proposing problems, seeking information, reducing irrelevancies. In Style One the leader would not direct the group to a solution, but would assist the group to arrive at its own solution.

Style Two, the negative style, was used in Conferences 2 and 3. The leader was instructed not to facilitate communication by clearing up misunderstanding. He was told to misinterpret and deliberately misunderstand participants' contributions, to speak ambiguously himself. The leader was to make no effort to produce among the members a sense of belonging to a unified group; he was to make no effort at compromise and was to give no indication that members were playing necessary roles, nor attempt to create personal liking among participants. He was to create the impression that one part of the group was working at cross purposes with other parts and that he did not have any feeling of belonging to the group. He was to heighten awareness of conflicting goals, minimize the need for the presence of participants, and emphasize the personal disagreements among the members. The leader was instructed not to perform the commonly considered leader functions of problem solving: summarizing, making proposals, setting procedural goals, drawing out information from the group, keeping the problem in focus. He was to prevent the group from summarizing by interrupting, to prevent others from developing solutions to problems by calling on someone else to contribute something different, to promote irrelevant comments and prolong discussion on irrelevant topics.

In order to assure that each conference would continue for an hour it was necessary to instruct the leader to avoid votes. If the participants were allowed to vote on decisions, a conference might terminate before the

hour and lose its comparability with the others. The two styles of leadership had different techniques to avoid voting. In Style One such statements as the following were suggested: "Perhaps we should wait with that until we are sure all aspects of this problem have been discussed. What about?" "Some of the group haven't had a chance to say anything for quite a while. Perhaps we should let them have something to say first--Jones?" In Style Two the following were suggested for use by the leader: "Well, before we do that, Jones was mentioning something a while ago that I think we ought to go back to;" "Well, what are we going to vote on? I see about five ideas floating around."

The behavior prescribed for the leader in Style Two sounds, when stated positively as it is in the major portion of the description of the style, almost impossibly inept and one might suspect that it would be inoperative because of its unreality. The fact is, however, that much of prescribed style consists of positive behaviors to be avoided while certain behaviors were prescribed which were designed to have negative effects. By and large the sins prescribed for the leader are those of omission rather than commission. This is what actually happened in the conferences also, as will be seen; the leader for the most part failed to take positive action to promote understanding, friendly interpersonal relations and efficient problem-solving process. The theoretical effect of this failure was negative in these three areas. It is for this reason that the terms negative and positive have been used to describe the two styles; they describe the hypothesized effects of the leader's behavior rather than the behavior itself.

The leader actually performed the behaviors which were prescribed

for him. Evidence for this is found in the typescripts and in the detailed analysis of the problem-solving behavior of the leader described in a later section.

B. Hypotheses

The design was constructed to permit testing of some of the more promising hypotheses mentioned in the theoretical framework. The main hypotheses dealt with can be divided into four classes: (1) hypotheses concerning the effects of leader behavior on outcomes; (2) hypotheses concerning the effects of leader behavior on process variables: interpersonal, problem solving and communication. These hypotheses are group hypotheses; the N is equal to the number of groups used; (3) hypotheses concerning the interrelations among process variables; (4) hypotheses concerning the relationship of process variables to conference outcomes. Listed below are examples of hypotheses of each type. The list of explicit hypotheses is illustrative rather than exhaustive. The hypotheses which were formulated prior to the experiment are discussed in connection with the measures which were used to test them.

1. The relationship of leadership styles to outcomes

The positive leadership style will produce a higher quality group decision, greater participant satisfaction with group decision, group process and leader performance than will the negative leadership style.

2. The relationship of leadership styles to process variables

The positive leadership style will result in a perception of greater unity on the part of participants and a greater feeling of being accepted

than will the negative leadership style.

The positive leadership style will produce relatively more supporting and fewer opposing contributions on the part of participants in the problem-solving process than will the negative leadership style.

3. The relationships among process variables

Persons who do considerable solution proposing will be regarded by their colleagues as more valuable than persons who do little solution proposing.

4. The relationships of process variables to conference outcomes

The more accepted as a member the individual feels, the greater will be his satisfaction with group decision.

The more solution proposing the individual does, the greater will be his satisfaction with decision.

C. The Problem

The participants were told they were to consider themselves a member of the board of directors of a grocery chain. They were to decide at this meeting upon the remuneration policy the company would adopt with respect to the managers of their 48 stores. This problem was in an area in which they were presumably interested, since they had elected a course in the field of personnel relations. It appeared small enough to be treated in an hour by persons of the competence of the participants. It is a problem on which there is considerable conflict in the society as a whole. Since there are established practices in the problem area, it seemed possible that an adequate criterion solution could be developed.

In one important respect the problem fell short of expectations. It was not sufficiently difficult. The fundamental solution-ideas were presented in the first few participations and at least one group might have terminated the discussion prior to the time limit had that been permitted. It should be stated, however, that the preventing of the vote was easily accomplished; and that participation rate actually increased as the conference proceeded. In other words, the limitation of the problem was that it allowed only trivial differences in the quality of the solutions of the group.

II. Procedure of the Conference Sessions

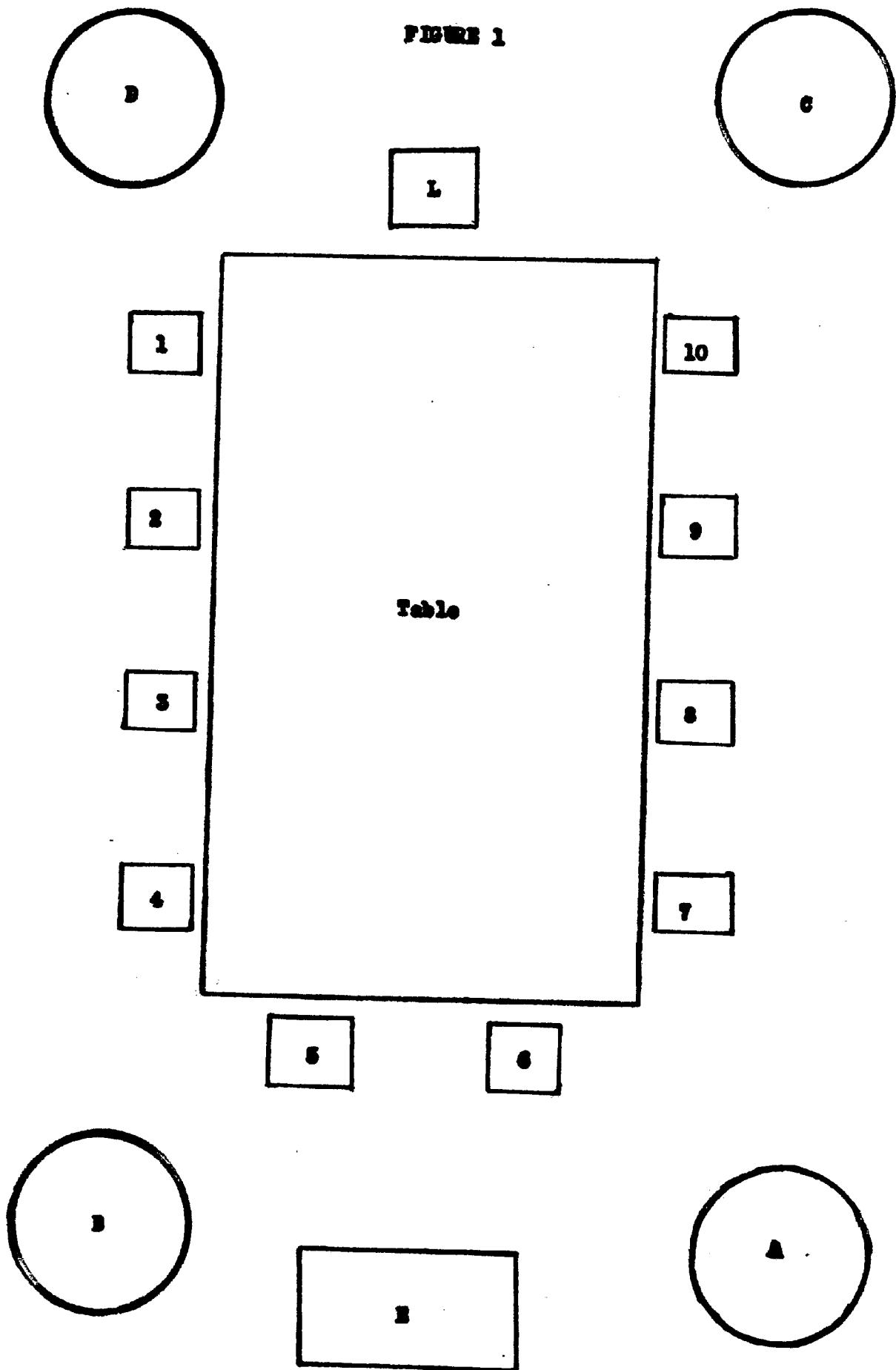
A. Conference Room Arrangement

Figure 1 shows the arrangement of the participants around the table and the position of the leader. Circles A, B, C and D indicate the position of the observers and experimenters. On the table in front of each participant was a card which showed his name and a number which provided identification for the observers. Each participant were a lapel microphone.

B. Observations

Two observers were situated at circle C. One kept a participation record which consisted of the participant's number, of the person to whom he spoke, and, in shorthand, the first few words of his contribution. This record was later synchronized with the recording when the typescript copies of the conference were made. The other observer at circle C recorded nods of agreement or disagreement unaccompanied by verbal opinion. The indices of agreement or disagreement were tabulated so that each participant's

FIGURE 1



reaction was synchronized and connected with the particular participation to which it was a response. For a variety of reasons, the data collected by this observer were inadequate and no analysis of them was made. At circle B an observer recorded the non-verbal indication of participant interest. The duties of this observer were to tally hand-raising by individual per five-minute period; to rate participant interest on a four point scale; to note looking at the speaker, laughing with the group or alone, postural changes, and head and hand movements. One of the two experimenters at circle A wrote down the decisions considered by the group. These were used in the experiment during the post-conference period. The other observer at A was assigned the same area as was given to the observer at circle B. At circle D two observers made anecdotal reports of the conference proceedings. The technician in charge of the wire recording apparatus was located at E.

C. Procedure of the Experiment

The schedule for the experimental period is shown in Table 1. The actual procedure can best be described by reproducing the instructions given to the experimenter in charge, which he followed exactly. After all the conferees were present and seated at the conference table the experimenter gave the following general orientation talk:

"This study in which you have been asked to participate is not related in any way to Psychology 94 or any other course in psychology. We are not interested in evaluating any of you personally or in testing what you know about conferences, about leading them or participating in them. Nor are we interested in testing your knowledge of the subject matter in the area of the problem you will be discussing. In short, this is not a test situation. Behave naturally, the way you want to behave; not because any text book tells you to behave in a particular fashion.

TABLE 1

ENTRANCE SCHEDULE

Thirty Minutes

1. General Orientation
2. Questionnaire I (Appendix A)
3. Questionnaire II (Appendix A)
4. Question Period

One Hour

5. Conference
6. Individual Solutions (Appendix B)
7. Voting on Conclusions (Appendix B)
8. Questionnaire III (Appendix B)
9. Questionnaire IV (Appendix B)
10. Questionnaire V (Appendix B)

"Our task consists of three parts. We will first ask you questions about various matters; then we will have an hour's conference, and finally, we will ask you questions concerning what went on during the conference itself, and your reactions to it. Just before we begin the conference itself, there will be ample time for questions."

"Except during the conference, will you please refrain from talking with each other about the subject matter of the questionnaires? We need to have your individual independent responses uncontaminated by group discussion."

(Questionnaire I was then distributed.)

"Let's first complete this questionnaire. Be sure to answer it on the basis of how you really feel, not on the basis of someone else's theories about conference procedures. Be sure to put your number on each questionnaire you fill out."

(Questionnaire II was distributed.)

"We'll have about ten minutes for answering this questionnaire."

Upon completion of Questionnaire II, the experimenter went on with the instructions:

"Before we begin the conference, may I explain how we plan to proceed. There will be a special chairman, whom you supposedly have elected chairman of your board of directors. You've done some role-playing before. Don't leave your roles as board members to make out-of-role wisecracks or comments. In your need for additional facts, you may dig into your past experiences for them or make them up, but don't fabricate wild facts which will destroy the reality atmosphere of the situation. Do you have any questions?"

The experimenter introduced the chairman to the participants and concluded his instructions by saying:

"Now, remember, you are directors of a company and you want to have the company succeed. All of you have something at stake in the success of the company. You have responsibilities to stockholders and employees. And this is a very important meeting for the future of the company."

Then followed the hour-long conference. At the end of the hour the

groups were interrupted and told:

"Now write out your own solution to the problem you have been discussing."

After these individual solutions were completed, the experimenter went on:

"As you were having your conference, I compiled a list of statements which represent possible decisions you might have come to during the conference."

"Will you mark your 'Voting on Decisions' sheet as to whether you agree or disagree with the decisions? Some of these decisions were really never agreed upon -- don't let that trouble you -- just tell me whether you agree or disagree with the statement as it stands."

These possible decisions were written on a blackboard. The participants indicated by hand-raising with which of these decisions they agreed. Those items on which five participants in a group of nine, and six participants in a group of ten agreed, were starred on the board and said to constitute the group decision. Then all the unstarred statements were erased (see Table 3, Evaluation of Conference Outcomes).

(8, 9, and 10. Questionnaires II, IV, and V)

"We are now asking you to fill out three questionnaires which concern what went on during the conference and your reactions to the conference. Be sure that your number is on the top of each questionnaire. When you finish one questionnaire, just signal and we'll give you another. We are asking you to answer every item on all the questionnaires. If you have any comments to make about any of your answers or any of the items, be sure to do so. Write them on the questionnaire itself. We are asking you not to converse among yourselves while working on the questionnaires. Notice that on some of the questionnaires, the scales don't all go in the same direction."

"After you are through, you are welcome to stay to listen to some of the recording or you may leave."

"We have one last request. We will be repeating this conference several times with other students in Psychology 94. It

will interfere with the research if any of the participants at subsequent meetings know about the problem we discussed. So we are asking you not to talk over the problem or the questionnaires with anyone."

After the experimental period the participants were permitted to listen to the wire recording and discuss aspects of the experiment with members of the research team.

EVALUATION OF CONFERENCE OUTCOMES

The experimenter interested in studying the factors affecting the effectiveness of a conference must decide with which of the many possible objectives of a conference he will concern himself. He can then determine the effect of process variables on the degree to which these objectives are achieved. It is possible for nearly everyone to think of ways in which conferences differ. The important step in the theorizing is to determine what outcomes are affected by these differences. Extent of participation by a member, for example, may be related to certain objectives and not to others.

As was mentioned in the discussion of the theoretical framework for this experiment two broad types of outcomes or products of a conference were selected for study: The decision(s) of the conference (their quality, number, executability, etc.), and effects on the participants (their satisfaction with decision, motivation to execute the decision, willingness to assume responsibility of decision execution, etc.). These, then, are the outcome variables in terms of which the theory was constructed. The theory holds that variation in the problem solving, communication and interpersonal variables operating during the conference directly affect these outcomes.

Not all of the outcome variables mentioned above were measurable in the experiment being discussed. The approach to measurement of decision quality was to compare the decisions actually reached by the conference groups with an external criterion of quality -- an expert solution to the same problem. Measurement of effects on participants was limited to a

study of participant satisfactions -- with the decision, with the leader, and the group performance.

I. Measurement of Quality of Decision

The criteria for evaluating solutions vary with the type of problem with which the group is dealing. To some problems there is one and only one correct answer; the correct answer is defined by some fixed, generally acceptable method, such as mathematical computation or logical analysis. The number of correct solutions, the number of problems completed per interval of time and the extent to which the group approximated the correct solutions are possible criteria when groups are dealing with problems to which there are correct solutions. An illustration of this type of research is that of Watson⁽¹⁴⁾ who used tests of intellectual functions in which the group's outcome score was represented by the number of correctly completed items. The Jenness experiment⁽⁹⁾ illustrates the use of the discrepancy criterion. There the degree of correctness of the group's decision-outcome as to the number of beans in a container was measured by the discrepancy between the actual count and the group estimate.

In sharp contrast to solutions based upon commonly accepted facts are those based on value considerations. Problems heavily loaded with value elements usually cannot even be appraised in terms of the judgments of experts, as experts are apt to disagree within these areas. In evaluating the outcome of the conference's decision on value problems, it is usually necessary to by-pass appraisal of the quality of the decision and rely upon such outcomes as the satisfaction of the participants with the decision or the effect of the decision upon their motivation to execute it.

Sometimes, however, the experimenter wants to employ problems to

which there is a medium of agreement among experts, the so-called "judgmental" type of problem. The investigator of conferences is especially interested in this kind of problem. Governmental and private organizations use groups for problems which demand the pooling of the judgment and experience of the organization's staff. Contrariwise, executives employ engineers to answer technical questions to which solutions are definitely ascertainable. Bechterev and Lange⁽³⁾ investigated the judgmental type of problem in their work on creative thought, but carried out no systematic evaluation of the quality of the group's product. Most groups will offer different solutions to judgmental problems, so that a yes-or-no type of scoring cannot be used. The usual practice is to compare the solutions with those arrived at by experts.

A. Construction of the Criterion Solution

A business administration graduate student, specializing in personnel work, consulted with experts of wide experience, and formulated two solutions to the problem submitted to the experimental groups (Appendix A). Two criterion solutions were necessary, because the problem as presented to the conference groups was ambiguous in not specifying the relationship between manager and home-office. One solution (the Local-Autonomy solution) was based on the assumption that the chain-store manager has considerable operating responsibility and makes store policy decisions in the field of merchandising and personnel practices. The other solution (the Central-Control solution) assumed that the manager operates under close, directive authority of the central office and their district manager. Examination of the individual and group solutions indicated that the local-

autonomy assumption was made by the participants. Hence, the Local-Autonomy key was used as the criterion solution in subsequent analysis. The criterion solution key is given in Table 2.

The validity of the scoring key was checked in two ways. It was applied to the remuneration policies of a state-wide chain of food stores operating with local manager autonomy. Of the 13 items in the criterion solution, there was agreement with actual practice on 10, disagreement on 2, and there was one omission. When the same key was applied to a national chain with a central-office control policy there were four agreements, six disagreements and three omissions. There is high agreement between practice and the appropriate criterion solution.

In a second test of the validity of the key, average of ratings by 72 judges were correlated with the scores obtained by applying criterion key. The judges, students in advanced business administration classes on personnel practices, were instructed to assume the chain-stores were operating with local manager autonomy. The correlation coefficient was .76.

The reliability with which the keys was applied to the actual data was checked by having 38 solutions scored by two coders. Since the key contains thirteen items, a total of 494 comparisons between key and solution were made as to whether there was agreement, disagreement or an omission. The key presented in Table 2 plus the special instructions presented in Appendix D were the entire basis upon which the coders operated. There was no verbal communication between them throughout the coding process. There was disagreement upon 43 of the 494 items; this amounts to an 87% agreement among the coders. Using the Craig-Guetskow category reliability tables⁽⁸⁾, the probable accuracy with which each item was correctly coded by a single coder is .93.

Measurement of Quality

TABLE 2

CRITERION SOLUTION KEY

<u>Solution Aspects</u>		<u>Local-Autonomy</u>
Salary provisions:		
1.	Store manager paid base salary	1
	2. equal to that of competing chains	2
1.	Store managers paid straight salary	
	2. greater than that of competing chains	
3.	Salary range provided	3
4.	large	
	small	4
	increases through any of the following:	
	length of service	
	merit based on:	
5.	Semi-annual ratings by central office and branch managers	5
	Quality and promptness of store reports	
Bonus provisions:		
6.	No bonus for store managers	6
7.	Bonus based on store net sales over a specific quota with quota adjusted for:	7
	store sales potential past quarterly sales	
8.	Bonus to be paid: quarterly	8
Cost of living adjustment:		
9.	Cost of living adjustment provided; adjustment made semi-annually	
	No cost of living adjustment made; bonus provision will adjust pay automatically	9
10.	Vacation benefits authorized with pay based on length of service	10
11.	Retirement benefits: None	11
12.	Insurance benefits: None	12
13.	Profit sharing: Yes	
	No	13

B. Experimental Findings

A fundamental problem, not clearly anticipated when the design was constructed, is, "What is the decision of the group?" Is it what the recorder or conference secretary reports in her minutes, the summary statement of the leader, or the solution of the individual participants? It is probably true that the "real decision", defined as the one which is put into effect, may be any one or several of these in combination, depending on the circumstances. This section investigates the effects of the leadership style manipulation on the quality of three of the many possible content outcomes of a conference: the voting behavior of the participants, integrated group solutions and individual post-conference solutions. These will be discussed in this order although in the experimental sequence the individual solutions come first, followed by the voting solutions and the integrated solutions, respectively. The first of these is comparable to what might be obtained with a group which votes on a series of agenda items; the items passed by a majority constitutes the group decision. The second, integrated solution, is analogous to the impression of group decision reported by the secretary or chairman. The third type of content outcome is similar to that of a training conference or a conference of independent department heads. The conference deals with a problem common to the participants but there is no single executor of the group decision.

1. Voting

During the meeting itself, a "consensus observer" attempted to construct a series of generalizations which seemed to represent the consensus of the group. At the end of the meeting after each participant had written

his individual post-conference solution, the list of general conclusions along with bogus statements not representing consensus was submitted to a vote. The statements were written on a blackboard and the subjects were requested to vote on the special sheet, "Voting on Decision" (Appendix B). The statements used for each group differed and are presented in Table 3. The results of the vote for each group, as well as the criterion score value of each statement, derived by applying the key to each item, are also presented in Table 3.

The quality of the total voting behavior of the groups was appraised by the following procedure. The three voting categories were given weights (2 for "Completely Agree", 1 for "Agree with Reservations", and 0 for "Cannot Agree") and their sum for each statement was multiplied by its criterion score. Then, the "decision" quality score for each group was the sum of the weighted scores on each statement. These results are reported in Table 4. The voting of Group 2 and Group 4 is markedly superior to that of the other two groups.

Substantially the same results were obtained when only those items upon which a majority of participants completely agree or agree with reservations were scored. This is the group decision had a simple majority criterion been used in accordance with customary parliamentary procedure.

There is, then, no congruence between the leadership pattern to which the groups were subjected and the total voting behavior of participants on the group decision as determined from the voting.

2. Integrated solutions

There was no secretary or recorder appointed for the groups. The

TABLE 3

VOTING ON DECISIONS

Statements presented to Group 1

Score on Local-Autonomy Criterion	Statement	Completely Agree	Agree with Reservations	Cannot Agree
0	*Basic salary should be adjusted to the cost of living in the locality.	7	1	1
0	Basic salary should be better than that paid by competing stores in the area.	3	5	1
-1	A straight guaranteed salary at an attractive level	2	2	5
0	Incentive pay plan should begin at the end of the first year's operation	1	4	4
+2	Incentive plan should be based on each store's gross receipts	1	2	6
+1	Salary increases should be voted by the board	4	3	2
+2	Bonuses should be granted on having met a sales quota	0	2	7
0	*Incentive pay should be a certain percentage of net profits of the store	7	2	0
0	Incentive should be figured and paid month by month	2	2	5

* Post-Conference Satisfaction measures reported in "Measurement of Satisfaction Outcomes" are based upon starred decisions.

TABLE 3 (Continued)

Statements presented to Group 2

Score on Local-Autonomy Criterion	Statement	Completely Agree	Agree with Reservations	Cannot Agree
+1	*Each manager should be paid a guaranteed base salary	10	0	0
+2	Base salary should be equal to that of our competitors	5	4	1
+1	Guaranteed base salary should be \$120	1	6	3
+2	Promotional increases in base salary should be based on seniority	4	4	2
+2	Commission based on turnover or sales in each store	2	3	5
+1	Incentive pay should be based on net profits of each store	5	2	3
-1	No incentive should be paid during the first year of operation	1	3	6
-1	Managers should be given shares of company stocks as bonus	0	3	7
+2	Incentive pay should be based on sales in excess of quotas set for each store	5	0	5
0	*Retail prices (ranges) should be set by home office	6	4	0

* Post-Conference Satisfaction measures reported in "Measurement of Satisfaction Outcomes" are based upon starred decisions.

TABLE 3 (Continued)

Statements presented to Group 3

Score on Local-Autonomy Criterion	Statement	Completely Agree	Agree with Reservations	Cannot Agree
+2	*Base salary should be comparable to that of our competitors	6	2	2
0	Base salary should be low to keep initial expenses down	1	3	6
-1	Cost of living bonus relative to area in which store is located	5	2	3
-1	Seniority promotions, hospital care, and retirement plans should be adopted	5	5	0
0	Incentive pay should be based on individual store profits	5	2	3
+2	Bonuses should be based on percentage of store sales	2	3	5
0	Managers should be rotated from store to store	1	1	8
0	*A supervisory coordinating board should have control over managers	8	1	1
0	*This board should also be responsible for promotional activities	7	3	0
0	A vice-president should be in charge of board of control and organize promotional activities through it	4	6	0
0	*District managers should report to sales vice-president who reports to Board of Directors	6	4	0

* Post-Conference Satisfaction measures reported in "Measurement of Satisfaction Outcomes" are based upon starred decisions.

TABLE 3 (Continued)

Statements presented to Group 4

Score on Local-Autonomy Criterion	Statements	Completely Agree	Agree with Reservations	Cannot Agree
+2	*Basic salary should be comparable to that paid by competitors	7	2	0
0	*Basic salary should include a cost of living adjustment	5	3	1
+2	Basic salary should be increased each five years on basis of length of service	4	5	0
+2	*Incentive bonus should be paid quarterly rather than yearly	8	0	1
+2	Incentive bonus should be a percentage based on relative excess sales over quota	3	6	0
0	Incentive bonus should be based on net profits of each store	2	3	4
0	Incentive pay should be based on combination of excess over quota and net profit of each store	3	3	3
0	Managers should advance from smaller stores to larger stores	4	4	1

* Post-Conference Satisfaction measures reported in "Measurement of Satisfaction Outcomes" are based upon starred decisions.

TABLE 4

THE QUALITY OF THE VOTING SOLUTIONS

<u>Participant #</u>	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>	<u>Group 4</u>
1	4	12	2	10
2	1	8	-3	14
3	4	17	-4	12
4	3	7	2	12
5	2	8	3	14
6	1	19	2	12
7	0	14	0	14
8	-	13	4	-
9	1	12	6	14
10	1	8	3	12
Total for all Statements	17	118	15	114

observer charged with the task of collecting consensus statements had considerable difficulty in determining just what consensus had been reached. A pair of judges, unacquainted with the criterion key, derived an "integrated" solution for each group on the basis of the post-conference individual solutions, the post-meeting voting, and the typescript of the conference proceedings. The resulting statements, reproduced in Appendix D, were then scored according to the Local-Autonomy key, with results as presented in Table 5. The clear superiority of Group 2 is no longer evident in terms of agreement with the criterion. Both Group 2 and Group 4, however, still show less disagreement with criterion than do the other groups. Again there is no congruence between the leadership pattern to which the groups were exposed and the quality of their integrated solution, in terms of amount of agreement with criterion. Inspection of the integrated solutions (Appendix D) indicates the great similarity of the groups in the content of their decisions.

3. Individual solutions

Another method of evaluating the effect of a conference is to compare the quality of the thinking of the participants before and after the conference. This method could be used in this experiment because each participant had written out his own solution to the remuneration problem before and again after the discussion. The individual solutions were scored with the Local-Autonomy key; the results are presented in Table 6.

The participants in all four groups were approximately equal in the quality of their pre-conference solutions; however, the participants in only one group, Group 4, ended the hour's discussions with significantly

TABLE 5

QUALITY OF INTEGRATED SOLUTIONS

	Group 1	Group 2	Group 3	Group 4
Agreements	23	23	38	54
Disagreements	23	8	31	8
Omissions	54	69	31	38

TABLE 6

QUALITY OF INDIVIDUAL SOLUTIONS
 PERCENTAGE SCORES ON LOCAL-AUTONOMY KEY

	Group 1			Group 4		
	Pre-	Post-	Difference	Pre-	Post-	Difference
Agreements	21	16	-5	18	40	+22
Disagreements	4	12	+8	3	9	+6
Omissions	75	72	-3	79	51	-28

	Group 2			Group 3		
	Pre-	Post-	Difference	Pre-	Post-	Difference
Agreements	21	24	+3	21	18	-3
Disagreements	3	8	+5	10	7	-3
Omissions	76	68	-8	69	75	+6

higher quality solutions than those with which they began. The participants in the other groups ended about where they began. Since the same result was not obtained with Group 1, where the same leadership style was used, this gain cannot be attributed to leader behavior.

In summary, then, the four groups began discussion of the problem with approximately the same degree of expertise and with individual solutions of equal quality. There were group differences in quality on all three of the decision outcomes. Two of the groups were superior in voting behavior, i.e., on the recognition test; Group 4 was superior on the integrated group solution and in the qualitative gain shown in individual solutions from pre- to post-conference, i.e., the reproduction test. These differences are not attributable to leadership style, however, since in each case of superior performance, only one of the pair of replicate groups was superior. The active, supportive leadership produced superior performance in only one of the groups so treated.

C. Methodological Implications

1. The differences in results when different products are used indicates that any experimental design must carefully consider which products will be evaluated qualitatively. It would be a mistake to assume that all would produce the same conclusion. The voting decision outcome is similar to the recognition method in memory experiments; it probably required less manipulation to produce an improvement using this product than it would to produce one in the individual solution product, which is similar to the reproductive method in memory experimentation.

2. The voting score as used here can definitely be improved upon.

The experimenter could present to the group standard list of statements with known relationships to the criterion. This would provide completely commensurate data for all groups. It would be desirable to have the list more extensive. This would provide a range index as well as a qualitative index of group performance. The range score might distinguish between groups which did a few things well but little else, from a group which did many things equally well. The recognition nature of this test may make it highly sensitive to pre-conference variables, such as expertise. Under certain circumstances, the voting test might also require pre-conference testing of the groups.

3. The change (gain or loss) score is a very meaningful one. While slanted toward the training type of outcome, it is applicable to decision-making conferences.

4. The "integrated" solution device, while similar to the notes of a secretary or chairman, had definite limitations as used in this study. These limitations were primarily related to the many unavoidable interpretations made by the integrators. It would be better to instruct the group at the outset to prepare a decision-solution at the end of the time limit. This should be a group project to prevent superior products from being due to the accident of a superior secretary.

5. In field situations it would be important to evaluate the execution-decision -- the group's "decision" as formulated by the person who will be executing the decision for the group.

II. Measurement of Satisfaction Outcomes

This section deals with the effects of the two leadership styles on the satisfaction of participants. On theoretical grounds, the negative leadership style, through its effects upon the interpersonal, problem-solving and communication variables, would produce lower participant satisfaction with the decision, with the group and leader performance than would the positive style. Questionnaire items immediately after the conference and again after an interval of two months measured satisfaction with decision and with group and leader performance.

A. Immediate Measures of Satisfaction with Decision and with Process

1. Satisfaction with decision

Two types of items (Questionnaire III, Appendix B) measuring decision satisfaction were constructed. General items were designed which would be applicable to all conferences regardless of content; in addition, items specific to the subject matter of the conference were utilized even though they would not be generally applicable in other conferences. The specific items were included to permit study of the nature of the general items. In addition, the specific items might be more sensitive to small differences in satisfaction, which the more generalised items would fail to detect. The four general items (Items 1, 4, 6, 8) required the participant to indicate his satisfaction with the decision, his judgment as to the quality and workability of the decision and finally the extent to which the decision met his objectives. On the four specific items (Items 2, 3, 5, 7) the participant indicated his satisfaction that relevant aspects of the problem and all relevant information had been considered and that the

decision would make for high manager morale and high manager participation. On all items the participant indicated his satisfaction on a ten-point scale.

Experimental findings.— Table 7 shows the product moment inter-correlations of these items for all four conference groups combined. Coefficients of correlation were computed separately for Groups 1 & 4 and Groups 2 & 3 to determine whether the degree of relationship among the items differed in the two sets of groups receiving differential treatment. Scatter diagrams were made to assist in interpretation of the data. Comparison of the matrices for the two sets of groups indicated that they did not differ significantly with respect to the degree of relationship between items. The data from all four groups were therefore combined to provide the values shown in Table 7.

Since no direct evidence as to the reliability of any of the questionnaire items is available, these intercorrelations provide indirect information concerning reliability. Two items, Item 2 and Item 5, stand out as showing markedly lower correlations with the other items although they do correlate significantly with each other (5% level). Virtually all the correlations among the other items are moderately high and significant at the 1% level.

Table 8 presents the means for each group and standard deviations of Groups 1 & 4 and Groups 2 & 3 on the satisfaction with decision items. None of the differences in means is statistically significant, although there is a tendency for Groups 1 & 4 to be slightly more satisfied than Groups 2 & 3.

With one exception there are no significant differences between the two sets of groups in variability. Groups 2 & 3 are significantly (5% level)

TABLE 7

INTERCORRELATIONS AMONG MEASURES OF SATISFACTION WITH DECISION

Item #	Over-all Satis. with Decision	Judg. of Quality of Decision	Ext. of Meeting Objectives	Satis. with Workability	Satis. with Relevant Aspects	Satis. with Relevant Information	Satis. with effect on Mgr. Morale	Satis. with Effects on Mgr. Participation
	1	6	8	4	2	5	3	7
1		.54**	.59**	.57**	.26	.31	.60**	.65**
6			.48**	.51**	.32	.29	.50**	.71**
8				.28	.39*	.19	.64**	.59**
4					.07	.20	.41*	.53**
2						.40*	.35*	.29
5							.25	.50**
3								.74
7								

* Significant at the 5% level

** Significant at the 1% level

+ All items are on Questionnaire III, Appendix B

TABLE 8

DIFFERENCES BETWEEN GROUPS ON MEASURES OF DECISION SATISFACTION

Group	Over-all Satis. with Decision (Item 1)*		Judg. of Quality of Decision (Item 6)		Ext. of Meeting Objectives (Item 8)		Satis. with Workability (Item 4)		Satis. with Relevant Aspects (Item 2)		Satis. with Relevant Information (Item 5)		Satis. with Effect on Mgr. Morale (Item 3)		Satis. with Effects on Mgr. Participation (Item 7)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
A - 1	7.3		6.3		6.1		7.9		6.4		6.7		7.2		7.6	
A - 4	6.9		6.1		5.6		8.1		7.6		6.0		6.8		7.0	
A - 2	6.5		6.5		6.0		7.5		7.0		5.8		7.2		6.8	
A - 3	6.1		6.7		5.5		7.9		6.3		6.4		5.6		7.0	
1 & 4	7.1	2.67	6.2	1.77	5.8	2.60	8.0	2.05	7.0	1.97	6.3	1.79	7.0	2.19	7.3	1.73
2 & 3	6.3	2.22	6.6	1.59	5.8	1.79	7.7	1.55	6.7	1.54	6.1	2.90	6.4	1.83	6.9	1.87

* All items are on Questionnaire III, Appendix B

more variable in their satisfaction with consideration of relevant information (Item 7).

Considering all the satisfaction items together, both leadership styles produced a good deal of satisfaction on the part of participants. This is indicated by the point at which the average ratings of each of the four groups fall on the scale items. While all the items are not exactly comparable with respect to the verbal descriptions beneath the scale intervals, the means of all four groups on all the items are above the midpoint of the ten-point scales. On the exactly comparable scales (Items 2, 3, 5, and 7) the means for all four groups are close to the "moderately satisfied" description on the scale.

When the means of the groups were compared from item to item, all four groups were significantly (5% level) more satisfied that the decision was workable (Item 4), than that relevant information had been considered (Item 5). Satisfaction with decision workability was significantly higher (5% level) than the mean on the quality of decision item (Item 6). The mean on the workability item (Item 4) was very significantly higher (1% level) than the mean on the item measuring extent to which the decision met the objectives of the participant (Item 8). These comparisons all involve the workability item. That these differences are real is further substantiated by the fact that on this item the description term "moderately" is at the midpoint while on the others it is higher on the scale.

The following conclusions may be drawn with respect to the decision satisfaction of participants: (1) The two sets of groups did not differ significantly in their satisfactions on any of the satisfaction with decision items. (2) All groups had mean scores above the midpoint on all the items.

(3) All groups were significantly more satisfied with the workability aspects of their decisions than they were with the quality of the decisions per se, with the extent to which the decisions met the objectives they had in mind, and with the amount of relevant information on which the decision was based.

Methodological implications.-- A single composite measure of satisfaction with decision was desired to facilitate the exploration of the relation of participant satisfaction to other outcome and process variables. The composite measure decided upon consisted of the arithmetic average of the scores on three general items: the over-all satisfaction with decision item (Item 1), the judgment of the quality of the decision item (Item 6) and the item concerned with the extent to which the decision met the objectives of the participant (Item 8).

To determine the relationship between general measures of decision satisfaction and satisfaction with specific aspects of decision, two of the specific items, satisfaction with effect of decision on manager morale, (Item 3) and satisfaction with effect of decision on manager participation (Item 7), were correlated with the composite measure of satisfaction. The resulting coefficients are shown in Table 9. There is a high correlation between the general and these specific items. It is apparent from both Table 7 and Table 9 that the most important factor in terms of which the participants evaluated the decision was its effect on manager participation and morale. This finding suggests that there is a general global factor which operates in both general and specific items. It is conceivable that other items on less important aspects of the decision would not result in

TABLE 9

THE RELATIONSHIP BETWEEN GENERAL AND SPECIFIC
MEASURES OF SATISFACTION

<u>Questionnaire III</u>	<u>Composite Satisfaction</u>
Item 3: Satisfaction with effect on manager morale	.71**
Item 7: Satisfaction with effect on manager participation	.63**

** Significant at the 1% level

in high correlations with general satisfaction.

The other two specific items, satisfaction that relevant aspects (Item 2), and that relevant information were considered (Item 5), show little relation to the general measures of satisfaction with decision. Examination of the wording of these items indicates strong reference to the way in which the decision was reached, rather than the decision itself. They will be examined with the items relating to satisfaction with process.

General considerations.- There is evidence from the survey of conference practices* that administrators using small decision-making conferences within their own organizations use two general types of criteria in evaluating conferences: (1) Obtaining the objectives for which the meeting was called. This frequently means accomplishing the purpose of the administrator himself and is thus leader satisfaction. (2) Obtaining participant satisfaction with decision. It would appear, then, that the emphasis placed on satisfaction with decision, either leader or participant, is not unrealistic and will meet with acceptance. Administrators rarely mention such criteria as increased motivation, increased knowledge, speed of decision-making, or even quality of decision.

2. Satisfaction with process

Only one item, a direct question as to the extent of satisfaction with the manner in which the group went about reaching a decision, measured over-all satisfaction with process (Questionnaire IV, Item 5). Another item, (Questionnaire IV, Item 6) measured satisfaction with leader

*The Conference Research project conducted a survey of conference practices in industry and government. The report of this study is now being prepared.

performance. The two specific items, mentioned above, were investigated as possible satisfaction with process measures: satisfaction with the extent to which relevant aspects (Questionnaire III, Item 2) and relevant information were considered, (Questionnaire III, Item 5). The inter-correlations of these items are shown in Table 10. The coefficients were computed separately for Groups 1 & 4 and Groups 2 & 3. Since these coefficients did not differ significantly, the data from all groups were combined.

Experimental findings.- The intercorrelations in Table 10 indicate that there is an important process element in Item 5, Questionnaire III, satisfaction with consideration of relevant information. The item measuring degree of satisfaction with consideration of relevant aspects (Questionnaire III, Item 2) is apparently even less related to satisfaction with process items than it is to satisfaction with decision measures. Hence, the item was not used in subsequent analysis.

A composite score, the arithmetic average of the participant's group process satisfaction (Questionnaire III, Item 5) and his satisfaction with the consideration of relevant information (Questionnaire IV, Item 5), was used in the following analysis as a measure of satisfaction with group process. This combination finds support in the survey findings, where information supply is considered an important aspect of process.

The lack of significant correlation between the satisfaction with group process item (Questionnaire IV, Item 5) and satisfaction with leader performance (Questionnaire IV, Item 6) indicates that there is not an over-all halo operating with respect to process. The absence of correlation is not due to lack of reliability of the leader performance item, since,

TABLE 10

INTERCORRELATIONS AMONG MEASURES OF
SATISFACTION WITH PROCESS

	Satis. with Consideration of Relevant Aspects (QIII, Item 2)	Satis. with Consideration of Relevant Information (QIII, Item 5)	Over-all Satis. with Group Process (QIV, Item 5)	Satis. with Leader Performance (QIV, Item 6)
	1	2	3	4
1 All Four		.40	.24	.11
2			.64**	-.12
3				-.14

* Significant at the 5% level

** Significant at the 1% level

Apparently the participants make a distinction between what is decided and how it is decided. There is a difference between being satisfied with the decision and being satisfied with how the group arrived at it. Further evidence is provided by the functional pattern data discussed in another section of this report. The pattern descriptions in that questionnaire are process descriptions. The fact that there was more than chance agreement among participants as to the appropriate pattern descriptions for each participant indicates that process observations were made and were made reliably. These findings suggest that the difficulty in getting process observations from participants may be reduced by the use of specific process questions.

Table 11 presents the means for all four groups and the standard deviation for Groups 1 & 4 and Groups 2 & 3 on the items concerned with process satisfaction. Only one of the differences in means is significant. The participants in Groups 1 & 4, the positive style groups, were significantly (1% level) more satisfied with the performance of the leader than were the participants in Groups 2 & 3, the negatively-led groups. The two styles of leadership left distinctly different degrees of satisfaction with the leader's performance. On this same item the difference in variance is significant at the 5% level. There was more disagreement about the adequacy of the leader's performance among the participants exposed to the negative style than was the case with the participants who experienced the positive leadership style. We will have occasion to refer to this finding again when discussing the relationship of the participant's attitude toward the leader to other variables.

The fact that there is no corresponding difference between the two

TABLE 11

DIFFERENCES BETWEEN GROUPS ON MEASURES OF PROCESS SATISFACTION

Group	Satisfaction with Consideration of Relevant Aspects (QIII, Item 2)		Satisfaction with Consideration of Relevant Information (QIII, Item 5)		Over-all Satisfaction with Process (QIV, Item 5)		Satisfaction with Leader Performance (QIV, Item 6)	
	M	SD	M	SD	M	SD	M	SD
A - 1	6.4		6.7		6.7		7.8	
A - 4	7.6		6.0		6.6		8.6	
A - 2	7.0		5.8		5.9		4.8	
A - 3	6.3		6.4		7.0		5.7	
1 & 4	7.0	1.97	6.3	1.79	6.6	1.96	8.2**	1.64
2 & 3	6.7	1.54	6.1	2.90	6.5	2.05	5.3	2.82

** Difference 1 & 4: 2 & 3 significant at the 1% level

sets of groups on the satisfaction with general process item (Questionnaire 4, Item 5) is added evidence that there is no over-all global effect with respect to process.

As was found with the satisfaction with decision measures, the absolute level of the mean scores is above the midpoint on the scale for all groups on all items except the one on which the two sets of groups differ significantly. None of the differences between items are significant.

Methodological implications.- More items measuring amount of satisfaction with process are needed to provide greater assurance of reliability of measurement and to shed light on the relationship between satisfaction with process in general and satisfaction with particular aspects of process.

Although difficult to score, open-ended questions might be used to determine the dimensions of process in the minds of the naive participant. These data would be useful in construction of process items.

The item concerned with leader performance, while satisfactory for the present purpose, is too general to reveal either the determinants of satisfaction with leader or the areas of inadequacy for training purposes. To attain these objectives, a variety of items concerned with leader performance should be constructed such as the following:

How satisfied were you with the way the leader summarized?

How satisfied were you with the leader's efforts to improve understanding among the members?

3. Summary: Measurement of satisfaction outcomes

In spite of marked differences in the manner in which the leader

behaved, there are no significant differences between the two sets of groups on any of the measures of decision satisfaction. Neither did the leadership styles manipulation produce differences between sets of groups in their satisfaction with the way the group proceeded to its decision. The differences in leader behavior did produce significant differences between sets of groups in participant satisfaction with the leader's performance. The participants exposed to the positive style were very satisfied with the leader; the participants exposed to the negative style tended to be slightly dissatisfied with the leader. There was also a significant difference in variability among participants in the two sets of groups in their satisfaction with the leader. The participants in Groups 2 & 3, the negative style groups, showed more disagreement among themselves as to the adequacy of the leader.

B. Delayed Measures of Satisfaction with Decision and with Process

How stable and enduring were the results obtained on the questionnaires presented immediately after the conference? Would the absence of differences on most items between the two sets of groups persist, or would differences appear over time? To answer these questions, two months after the experimental conferences the participants received a mail questionnaire (Appendix C) on their post-conference satisfactions. The delayed questionnaire data also provided opportunity for checking, to some extent at least, the reliability of items concerned with satisfaction with decision and satisfaction with group process.

On Item 1 of the delayed questionnaire the participant indicated whether or not he would be willing to participate without stipend in another

experimental conference. Item 2 was intended to provide a measure of the extent to which the individual was attracted to his group; it asked whether he would want to be in the same group or another group if he were to participate again. Item 3 measured the participant's desire for the same leader as opposed to a new leader. Item 4 measured satisfaction with process and Item 5, satisfaction with decision. The last item, Item 6, concerned extra-curricular speech activities and was analyzed in connection with the matching of the groups.

1. Experimental findings

The percentage of returns failed to differentiate between the groups; all groups showed 100% return. Time of return scores based on the percentage of returns over various periods of time also showed no differences between groups. Only 5 of the 38 participants required a follow-up letter and inadequate mail service was responsible for the failure of several to return the questionnaires more quickly.

Table 12 shows the means for each of the four groups and the means and standard deviations for Groups 1 & 4 and Groups 2 & 3 on the questionnaire items. The difference between the two sets of groups on Item 3, desire for the same leader, is statistically significant at the 1% level. None of the other differences is statistically significant. These findings exactly reproduce the results on the measures obtained immediately following the conferences. Then Groups 2 & 3 were also much less satisfied with leader performance than were Groups 1 & 4. As was the case with the immediate measures, all the differences are in favor of groups with the positive leader.

The mean scores for the two sets of groups on the delayed

TABLE 12

MEANS AND STANDARD DEVIATIONS ON
DELAYED QUESTIONNAIRE ITEMS

		A - 1	A - 2	A - 3	A - 4	1 & 4	2 & 3	t
Item 1:	% Willing to Return	89	80	100	67	78	90	
Item 2:	Desire for Same Group	M 5.78	4.6	5.1	5.33	5.55	4.85	1.55
		SD				1.94	3.04	
Item 3:	Desire for Same Leader	M 6.55	5.2	5.0	8.11	7.33	5.10	2.53**
		SD				2.70	2.60	
Item 4:	Satis. with Process	M 5.76	5.3	6.5	6.33	6.06	5.90	
		SD				2.00	2.05	
Item 5:	Satis. with Decision+	M 7.44	6.5	6.4	7.00+	6.83	6.45	
		SD				2.01	1.80	

** Difference between means significant at the 1% level

+ The n in Group 4 is 8 instead of 9, as one participant failed to check Item 5

questionnaires are above the midpoint on all items except one. On an absolute basis the experimental experience was apparently a satisfactory one. The favorable attitude toward it noted in the high mean scores immediately after the conference persisted over the two months' interval.

Table 13 presents the correlations between the delayed questionnaire items and pertinent items from questionnaires administered immediately following the conference. The person's desire for the same group (Item 2) is not related to his earlier feeling of being accepted as a group member; nor is it related to his original perception of the unity of the group. Item 2 is in no sense parallel to the two immediate post-conference measures and therefore does not provide a check on the reliability of these items. As the reliability of the immediate measures was judged to be satisfactory, the lack of correlation may be due to the fact that Item 2 is measuring some other factor or is unreliable. The latter possibility is strong, since the item did not specify the nature of the new group to which the respondent might be assigned. The item may be a poor measure of willingness to gamble on the possibility of an improvement rather than a judgment of the adequacy of his group compared with other groups.

Item 3, concerned with desire for the same leader, shows a correlation which is significant at the 1% level with satisfaction with leader performance as measured immediately after the conference. Desire for the same leader is not correlated with personal liking for the leader. This indicates that the performance of the leader was judged relatively independently of any affective value the leader might have had for the participant.

Item 4 on the delayed questionnaire, concerned with satisfaction

TABLE 13

INTERCORRELATIONS OF DELAYED QUESTIONNAIRE ITEMS
AND IMMEDIATE POST-CONFERENCE MEASURES ON ALL FOUR GROUPS

Item 2: Desire for Same Group		
vs. feeling accepted as member (QIII, 8)		-.02
vs. composite measure of participant's perception of unity (QIII, 13 + QIV, 1)+		-.29
Item 3: Desire for Same Leader		
vs. satisfaction with leader perfor- mance (QIV, 6)+		.53**
vs. personal liking for leader (QIV, 7)+		.20
Item 4: Satisfaction with Process (Delayed)		
vs. immediate satisfaction with process (QIV, 5)+		.45**
vs. composite measure of satisfaction with process (QIV, 5 + QIII, 5)+		.42**
Item 5: Satisfaction with Decision (Delayed)		
vs. immediate satisfaction with decision (QIII, 1)++		.60**
vs. composite measure of immediate satis- faction (QIII, 1, 6, and 8)++		.68**

** Significant at the 1% level

+ These questionnaire and item numbers refer to the material in Appendix B

++ The n here is 37, as one participant in Group 4 failed to check Item 5

with process, correlates significantly with the immediate measure of satisfaction with process. The wording of this item on the two questionnaires was identical. The delayed satisfaction with process item also correlates significantly at the 1% level with the composite measure of satisfaction with process. It seems clear that both general process observations and leader behavior ratings can be reliably made.

The fifth item, concerned with satisfaction with decision, shows a high correlation with the identically worded immediate decision satisfaction item. It is also highly correlated with the composite measure of immediate satisfaction.

Certain intercorrelations of items on the delayed questionnaire are relevant to problems raised in connection with the immediate measurement of outcomes. It will be recalled that the relationship between satisfaction with decision and satisfaction with process was low in the immediate outcome measures. This same result was obtained with the delayed questionnaire items in these areas; the correlation between these measures was .23 for all four groups combined.

The lack of relationship between satisfaction with the leader and satisfaction with process found with immediate measures is confirmed by the correlation coefficient of .21 between desire for same leader (Item 3) and satisfaction with process (Item 4) on the delayed questionnaire.

These findings are important indications that in spite of the high absolute scores given by the participants on virtually all items, there was no over-all halo surrounding the conference. Certain items of demonstrated reliability show only chance relationships to each other, indicating that participants were making discriminations and were judging

selectively.

2. Methodological implications

The methodological conclusions based upon this experience with the delayed questionnaire concern the reliability of items. Both immediate and delayed measures of decision satisfaction, satisfaction with group process and leader performance are apparently reliable.

The item measuring willingness to participate in another conference (Item 1) was not sufficiently specific. Several of the participants who stated they were not willing to return apparently regarded it as a request for subjects. They were unavailable rather than unwilling. A series of items, or a single item, graded in terms of the amount of effort or personal discomfort required of the participant in the event of return would be a more adequate measure of willingness to return.

The methodological limitation of the measure of desire for the same group, (Item 2) has already been mentioned; namely, the failure to designate the type of group in which the participant might find himself in the event of another conference. This, as has been said, made the choice a blind one for the participants.

It might appear that Item 3, desire for the same leader, has the same methodological limitation, in that the kind of leader the participant might encounter is not specified. Undoubtedly, the item would be improved if it provided a basis for comparing the old leader with a new one. The omission probably had less effect because participants had more basis for evaluating the leader with other leaders they had experienced than they did for evaluating their group. Their experiences with discussion leaders, even in the educational process, were more extensive than with groups of

the type they experienced in the experimental conferences. There is apparently a more stable frame of reference with respect to leader behavior than with respect to group process. Items concerned with group process apparently must provide anchoring points or standards of judgment. Items directed at participant satisfaction with leader are less affected by the absence of such imposed standards.

3. Summary: Delayed measurement of satisfaction outcomes

The delayed questionnaire results provide corroborative evidence with respect to methodological and theoretical conclusions based on the immediate measures of satisfaction outcomes. Methodologically, these findings substantiate the conclusion that the measures of decision satisfaction, process satisfaction, and satisfaction with leader performance are sufficiently reliable to be used as criteria. Theoretically, there is support for the conclusion that group process is judged independently from leader process. There is also confirmation that the participants distinguish between process satisfaction and decision satisfaction. Finally, the delayed questionnaire confirms the fact that the leadership style change produced significant differences between the two sets of groups with respect to satisfaction with the leader.

III. The Relationship between Quality of Decision and Participant Satisfaction

The external criterion score for each participant was correlated with all of the satisfaction measures, both immediate and delayed. None of the coefficients is significantly different from zero.

This finding should be related to an earlier one, namely, the

correlation of .54 between the participant's judgment of decision quality and his satisfaction with the decision. This indicates that the participant's judgment of decision quality is related to his satisfaction with decision. The lack of correlation between objective measures of quality and satisfaction merely indicates that the participants can be, and in this case were, incorrect in their judgment of quality, if one accepts the external criterion as a measure of quality. When, however, the conference group is composed of experts as competent to judge the quality of their decisions as any other group, one might expect to find a high correlation between the quality of the decision and the satisfaction of participants. This is probably the usual case with top management conferences in industry and government. At this level an external criterion measure of quality, which in most cases must be judgment of experts, becomes identical with participant satisfaction. This reasoning plus the findings suggest the following hypothesis: For a given group, there is positive correlation between participant satisfactions and the quality of their decisions.

There are, of course, other factors than decision quality which affect decision satisfaction, as we shall see in the following section. When groups are matched on these determinants, as well as being equated as to standards of judgment, one would expect to find a positive correlation between the decision quality and participant satisfaction.

MEASUREMENT OF PROCESS VARIABLES

This section describes the process variables which were measured and the effects of the leadership styles upon these variables in the two sets of groups.

I. Interpersonal Variables

In the theoretical framework, discussed at the beginning of this report, conference outcomes were hypothesized to be affected by certain interpersonal variables. The variables which were regarded as especially important were (1) the degree to which the members perceived themselves as unified as to goals, (2) the degree to which the participants felt they needed each other in order to accomplish objectives and (3) the degree to which the participants liked each other personally. An attempt was made to measure each of these variables and, in some instances, several items were constructed to measure the same variable. For the most part, interpersonal variables were measured by means of questionnaire items. This section concerns the interpersonal variables measured and the effects of the leadership style differences upon them.

A. Measurement of Interpersonal Variables

The degree of unity as to specific goals, referred to in the theoretical framework, was not measured directly in the experiment. It was approached indirectly by means of two items (QIII, Item 13; QIV, Item 1). The items are essentially measures of the extent to which the members perceived their groups as being unified in general. They are global measures of the extent to which the members perceived the group as unified

on a number of dimensions. Two items measured the extent to which each participant was regarded as needed by his colleagues (QIII, Item 5; QIII, Item 9). One item (QIII, Item 10) measured the extent of personal liking among members. A separate item measured personal liking for the leader (QIV, Item 7). One item (QIV, Item 8) measured the extent to which the individual felt accepted as a member. In a sense this is a direct measure of cohesiveness since it is a verbal-report type of measure, of the type discussed in the section concerned with the theoretical framework. In addition to those items, several others attempted to measure some of these same dimensions indirectly. These items and the theoretical bases for their use will be presented in connection with the discussion of their adequacy.

1. Experimental findings

Table 14 shows the correlation coefficients obtained between all pairs of items, for Groups 1 & 4 and Groups 2 & 3, and for all four groups combined.

Adequacy of measures.— The two items measuring the participants' perception of unity, which differ in wording (QIII, Item 13; QIV, Item 1) (Appendix A), correlate significantly at the 1% level. This correlation is indicative of considerable stability on the part of these items. In subsequent analysis a composite score based on a simple arithmetic average of these two items has been used as a measure of participant perception of unity.

Item 9 of Questionnaire III asked the participants to indicate the two individuals with whom they would most like to participate in another

TABLE 14

INTERCORRELATIONS AMONG INTERPERSONAL VARIABLES

	Judg. of Grp. Feeling (QIII, 13) 1	Judg. of Unity as Member (QIV, 1) 2	Feeling Accepted as Member (QIV, 8) 3	Acceptability as Future Partic. to Others (QIII, 9) 4	Acceptability as Present Partic. to Others (QIV, 9) 5	Acceptability as Person to Others (QIII, 10) 6	Number of Removals Changing Grp. (QIV, 2) 7	Number S Felt Rej. by (QIV, 3) 8	Number S Felt Acc. by (QIV, 4) 9
1	1 & 4	.57**	.24	.04	-.08	.29	.10	.06	-.09
	2 & 3	.56**	.31	.36	.30	.32	.29	-.36	.22
	1 - 4	.62**	.28	.19	.09	.30	.16	.12	.07
2	1 & 4		.34	-.17	-.12	.31	-.03	-.31	-.48*
	2 & 3		.41	.21	.38	.30	.02	-.09	.01
	1 - 4		.38*	.02	.07	.30	-.03	-.18	-.19
3	1 & 4			.31	-.03	.06	.01	-.29	.04
	2 & 3			.47*	.12	.19	.17	.07	.58**
	1 - 4			.39*	.05	.13	.09	-.09	
4	1 & 4				.72**	.52*	.19	.23	.45
	2 & 3				.69**	.56**	.06	-.14	.41
	1 - 4				.70**	.54**	.13	.06	.42**
5	1 & 4					.38	.32	.38	.39
	2 & 3					.38	.05	-.11	.00
	1 - 4					.38*	.20	.14	.30
6	1 & 4						.01	-.09	-.35
	2 & 3						.18	-.19	.23
	1 - 4						.10	-.14	.11
7	1 & 4							.50*	.35
	2 & 3							.21	.43
	1 - 4							.35*	.39*
8	1 & 4								.63**
	2 & 3								.63**
	1 - 4								.61**

* Significant at the 5% level
 ** Significant at the 1% level

conference, and the two individuals with whom they would least like to participate again. Item 9 of Questionnaire IV required the participants to categorize every other member of the group with respect to his value as a participant. The latter question asked the participant to state what the effects of absence of each participant would have been on the progress of the group -- whether the absence would have hurt, helped, or made no difference. Both these items were scored in similar fashion. The number of persons who reacted negatively to the individual were subtracted from the number reacting positively. The score thus represents for each individual the prevailing attitude toward him. A high positive score indicates a large number of persons reacting positively to the individual, either as a future participant (QIII, Item 9) or as a present participant (QIV, Item 9). This scoring system has limitations in that subtle differences in social climate are not reflected. For example, a person accepted by three persons and rejected by none receives the same score as a person accepted by six persons and rejected by three. However, since this score correlates highly with those obtained by several other more intricate scoring systems, its simplicity warranted its use. The mean score for an entire group on these measures may be used as an index of the extent to which there is an accepting or rejecting attitude among participants toward each other. As such, the items measure the perception of interdependence among the group members. Because of the high correlation between them, the arithmetic average of the individual's scores on the two items was used as a composite measure of the acceptability of the individual as a participant. Evidence for the reliability of this composite score comes from data derived from the Functional Pattern questionnaire (Appendix B). The composite

measure correlates .64 with the number of times the individual was classified by his colleagues as performing functions which promoted the problem-solving process.

Item 2 of Questionnaire IV required the participant to circle the number of the person whose removal he thought would affect the group. It was originally intended as an alternative measure of interdependence of members, by assuming that in a group which had high attractiveness for the members more names will be circled than in a group with less attractiveness for its members. The low order of intercorrelations shown by this item indicates its probable lack of reliability. The item was not used in the intensive analyses of the experimental findings.

Personal liking among participants was measured by means of Item 10 in Questionnaire III. The participant indicated the individuals he liked personally "most", "next most", and liked "least" and "next least". Each individual's score is the number of persons who placed him in the "least" or "next least" categories subtracted from the number who like him "most" or "next most". Analogous to the items concerning the individual as a group participant (Items 9 on QIII and QIV), this score represents the personal liking climate in which the individual operated. As with the interdependency measures, the average score for all participants represents the prevailing attitude among the group members as to personal liking for each other. The general order of the correlations of this item with other items warrants its use as a measure of personal liking. Additional evidence of its reliability is the correlation of .54 between this item and the number of times the individual was classified by his colleagues in a positive, personal-relations-improving functional pattern.

The instruments used in the experiment do not permit direct evaluation of the item on personal liking for the leader (QIV, 7). Adequate stability of the item can be inferred from its correlations with other measures with which, on a priori grounds, one might expect a relationship. For example, personal liking for the leader correlates .57 with immediate satisfaction with leader performance.

The measure of the individual's feeling of acceptance as a group member (QIV, Item 8) was supplemented in the questionnaire by a definition of what was meant by "accepted" and "rejected". The level of inter-correlations shown by this item indicates that it is a reliable measure of the extent to which the participants felt accepted. Two other items were constructed to measure the extent to which the individual perceived himself as accepted or rejected. Item 3 in Questionnaire IV required the individual participant to indicate those participants who, in his opinion, rejected his contributions. The hypothesis is that feeling one's contributions were rejected is closely related to the person's feeling of belonging, and that high incidence of this feeling for all members is indicative of general lack of attraction toward the group on this dimension. Item 4, Questionnaire IV, is similar to Item 3 except that it asked the participant to indicate those persons who he felt accepted his contributions. In general, both of these items show negligible correlations with other items. Since the items are worded in terms of accepting and rejecting contributions, the supporting and opposing aspects of the definitions of acceptance and rejection provided on the questionnaire were emphasized, virtually equating agreeing with accepting and disagreeing with rejecting. Evidence that the participants gave this interpretation to the items came

from interviews with them two months after the conferences. In addition, the items provide a very restricted range of scores, which reduces the possibility of substantial intercorrelations. They do, however, correlate significantly with each other, and with the number of persons whose removal the participant felt would affect the group (Item 2, QIV). Since all of these items require the individual to in some way identify or designate his colleagues, there is a possibility that the significant correlations among these three measures may be due to a "tendency to respond". An opportunity to check this is provided by the Functional Pattern questionnaire (QVB, Appendix B), which asks the participant to indicate the appropriate functional pattern for his colleagues. Opportunity for classifying a single participant in a number of patterns was possible. There is no correlation between the number of pattern placements which the participants made and the number of persons he checked in QIV, Items 2, 3 & 4. Another possible explanation for the correlation between QIV, 3 and QIII, 4 is that the persons who felt accepted as well as rejected by a large number of people were in fact accepted and rejected, i.e., supported and opposed, by a large number of people. The opportunity for testing this hypothesis came from the opposing and supporting problem-solving categories. The number of persons each participant was supported and opposed by was tabulated. The correlation between the number of times the individual was supported and the number of times he was opposed is .41, significant at the 5% level. There is, therefore, evidence that, in the light of the way in which the items were interpreted, the persons who were agreed with by a larger number of people were also disagreed with by a larger number of individuals. With

this evidence of the strong relationship between opposing and supporting and these items, the items are not regarded as satisfactory alternative measures of the extent to which the individual felt accepted as a member of the group.

On the basis of the intercorrelations of items, five interpersonal variables were selected for use in the intensive analyses of the experimental findings. These were: the individual's perception of the unity of the group (QIII, 13 and QIV, 1); his feeling of acceptance as member (QIV, Item 8); his acceptability as a participant to his colleagues (QIII, 9 and QIV, 9); his acceptability as a person (QIII, 10) and his personal liking for the leader (QIV, Item 7).

The interrelations among interpersonal variables.- Table 15 shows the intercorrelations among the five interpersonal scores which were selected for further analysis.

The individual's perception of unity correlates significantly at the 5% level with his feeling of being accepted as a member. It is not related to his acceptability to his colleagues as a participant, but is related to his acceptability as a person. This suggests that personal affective relations are more important than dependency relations in producing a perception of unity in the individual.

The data in Table 15 also show that a person feels accepted as a member without this actually being the case. The individual's feeling of being accepted is unrelated to his actual acceptance status in the group, either as a participant or as a person. This suggests that the individual's perception of unity is to a considerable degree a projection of his own feelings of acceptance.

TABLE 15

INTERCORRELATIONS AMONG COMPOSITE
INTERPERSONAL SCORES

	Perception of Unity (QIII, 13) (QIV, 1)	Feeling Accepted as a Member (QIV, 8)	Accepta- bility as Participant to Others (QIII, 9) (QIV, 9)	Accepta- bility as Person to Others (QIII, 10)	Personal Liking for Leader (QIV, 7)
	1	2	3	4	5
1	1 & 4	.31	-.04	.32	.38
	2 & 3	.40	.36	.35	-.18
	1 - 4	.36*	.15	.33*	.11
2	1 & 4		.13	.06	.14
	2 & 3		.42	.19	.09
	1 - 4		.28	.13	.12
3	1 & 4			.48*	.25
	2 & 3			.56**	-.26
	1 - 4			.52**	-.05
4	1 & 4				.11
	2 & 3				.06
	1 - 4				.00

* Significant at the 5% level

** Significant at the 1% level

The persons who were highly regarded by their colleagues as participants were also those who were best liked personally. The correlation between the two acceptance scores is .52, significant at the 1% level.

The participant's attitude toward the leader as a person is not significantly correlated with any of the other interpersonal scores. There are indications in Table 15 that personal liking for the leader has a different relationship to the other interpersonal variables in the two sets of groups. Although the coefficients are not significantly different in the two sets of groups, these tendencies deserve to be noted since they appear many times in other connections. Personal liking for the leader is positively related to composite measure of perception of unity in Groups 1 & 4 and negatively related in Groups 2 & 3. The correlation coefficients are significantly different in the case of one of the measures making up the composite score, Item 13 in Questionnaire III. In Groups 1 & 4 the correlation is $+.55$ and in Groups 2 & 3 it is $-.31$. This same tendency is found with the other item making up the composite, although the coefficients are not significant. These differential relationships, which will be pointed out frequently, indicate that in Groups 2 & 3 the leader was perceived apart from the participants while in Groups 1 & 4 the leader was not set off from the group. If one liked the leader in Groups 1 & 4, one perceived the group as unified; in Groups 2 & 3, if one liked the leader one tended to perceive disunity.

The relationship between personal liking for the leader and the individual's value as a participant in the eyes of his colleagues is almost significantly different in the two groups. Persons who liked the leader were highly regarded by their colleagues in Groups 1 & 4; the persons who disliked the leader were highly regarded in Groups 2 & 3. Personal liking

for the leader had a different meaning, a different significance in the two sets of groups. It will be seen in other sections of this report that liking the leader dictated different behaviors and different outcomes in the two sets of groups.

Comparison of groups on the interpersonal variables.- Table 16 shows the means and standard deviations of all four groups on the measures of interpersonal relations which were selected for further analysis. One of the differences in means is statistically significant: the members of Groups 1 & 4 liked the leader personally to a significantly greater extent than did the members of Groups 2 & 3. The leadership style differences produced no other significant differences between the groups on the interpersonal scores.

The mean scores for the groups on the items presenting ten-point scales to the participants (QIII, Item 13; QIV, Items 1, 7, 8) are all above the midpoint. In general, then, from an absolute standpoint, the participants regarded themselves as accepted members of unified groups with a leader for whom they had considerable liking. The significant difference between sets of groups with respect to personal liking for the leader on Item 7 of Questionnaire IV is corroborated by the sociometric item on personal liking, Item 10 on Questionnaire III. The leader was checked by six participants in Groups 1 & 4 as being liked "most" or "next most" whereas in Groups 2 & 3 only two persons found the leader likeable personally. The mean scores on Questionnaire III, Item 9, accepting the individual as a participant in future conferences, and Questionnaire III, Item 10, liking for the participant as a person, may be interpreted if one notes that a score of zero indicates that the attitude toward the participant is that of neutrality. The prevailing attitude toward the

TABLE 16

MEANS AND STANDARD DEVIATIONS ON
INTERPERSONAL VARIABLES

Group	Perception of Unity (QIII, 13) (QIV, 1)		Feeling Accepted as a Member (QIV, 8)		Accepta- bility as Participant to Others (QIII, 9) (QIV, 9)		Accepta- bility as Person to Others (QIII, 10)		Personal Liking for Leader (QIV, 7)	
	M	SD	M	SD	M	SD	M	SD	M	SD
A - 1	5.7		7.5		2.2		-.22		8.9	
A - 4	6.6		8.3		.7		-.22		8.3	
A - 2	5.2		7.5		1.4		-.20		7.3	
A - 3	6.2		7.9		2.3		.00		7.1	
1 & 4	6.14	1.74	7.9	2.14	1.44	2.83	-.22	2.49	8.6*	1.63
2 & 3	5.70	1.65	7.5	1.49	1.80	2.55	-.10	2.57	7.2*	1.86

* Differences between means significant at the 2% level

individual in both sets of groups on both these dimensions is that of neutrality.

2. Conclusions

Methodological findings.-

- (1) A score based on Questionnaire III, Item 13, and Questionnaire IV, Item 1, is an adequate measure of the individual's perception of unity.
- (2) Questionnaire IV, Item 8, has sufficient reliability to warrant its use as a measure of the extent to which the individual feels accepted.
- (3) Questionnaire III, Item 9, acceptance of the individual as a future participant, and Questionnaire IV, Item 9, acceptance of the individual as a present participant, have satisfactory reliability and may be used as measures of the interdependence of members.
- (4) Questionnaire III, Item 10, personal liking for the participant, has sufficient reliability to warrant its use as a measure of the personal liking dimension. The same is true for the item concerned with personal liking for the leader, Questionnaire IV, Item 7.
- (5) The measures of reliability of all items discussed have been inadequate. One useful approach to this problem would be to insert the identical item in two separate places in the questionnaire battery.
- (6) The inadequacy of the indirect measures of the extent to which the individual felt accepted or rejected in terms of the number of persons whom they thought accepted or rejected their contributions is probably due in large part to the definition of the terms. It should be

noted that the direct item concerned with feeling accepted as a member also used the term, but avoided the implication of being agreed with or disagreed with by the phrase "accepted by the other participants as a member of the conference group".

(7) The measures used in this experiment do not provide adequate insight as to the bases on which judgments of unity and feelings of being accepted are made. A series of items probing for other observations of the participant in the interpersonal area would be helpful in finding these determinants. Such items might ask how many participants were on the participant's side, how many tried to dominate the discussion, how many cliques there were.

(8) The sociometric types of items, while of demonstrated value, should be modified to permit every person to react to every other participant. This would permit another score to be derived, namely, a measure of the extent to which the individual reacted positively or negatively to the others as persons, and as participants. In addition to this score, this modification of the item would provide more representative measures of group attitudes toward the individual members, since the individual's score will be based upon the ratings assigned by all the members.

Theoretical implications.- The individual's perception of unity shows a low but significant correlation with the individual's feeling of acceptance as a member. The participant's perception of unity is not related to objective measures of the attitude of the other persons toward him as a participant. The individual's feeling of acceptance is not significantly related to the attitude of acceptance or rejection of him on

the part of others. The individual's value to the group as a participant is significantly related to the attitude of the group toward him as a person.

The general relationship between the leader and the group affects the relationship among participants. Specifically, when the leader and the group are seen as cooperating, the most valuable participants also like the leader personally. When the group and the leader are perceived as set off from each other, the most valuable participants in the opinion of colleagues are those who dislike the leader most.

The leadership style variation produced no differences between the two sets of groups in the extent to which unity was perceived, in the extent to which the members felt accepted or in the extent to which they were accepted, as persons or as participants. The participants in the positive-style groups liked the leader personally better than did the participants in the negative-style groups.

B. The Relationship of Interpersonal Variables to Conference Outcomes

1. The relationship of interpersonal variables to immediate measures of participant satisfaction

Satisfaction with group process.- Some of the determinants of the participants' satisfaction with the manner in which the group went about its task can be deduced from Table 17. None of the interpersonal variables are significantly related to satisfaction with group process for all four groups combined. The tendency for those who felt most accepted to be most satisfied is nearly significant at the 5% level. In both sets of groups there is no relationship between the extent to which the participant was personally liked by his colleagues, and his satisfaction with the group

TABLE 17

THE RELATIONSHIP BETWEEN INTERPERSONAL VARIABLES AND MEASURES OF PARTICIPANT SATISFACTION

	Perception of Unity (QIII, 13) (QIV, 1)	Feeling Accepted as a Member (QIV, 8)	Acceptability as Participant to Others (QIII, 9 - QIV, 9)	Acceptability as Person to Others (QIII, 10)	Personal Liking for Leader (QIV, 7)	
Satisfaction with Group Process	1 & 4 2 & 3 1 - 4	-.08 .50* .27	.42 .24 .30	.52* .01 .20	-.04 -.11 -.08	-.04 -.39 -.23
Satisfaction with Leader Performance	1 & 4 2 & 3 1 - 4	.19 .13 .19	.34 .19 .24	-.05 -.08 -.09	-.22 .28 .08	.44 .51* .57**
Satisfaction with Decision	1 & 4 2 & 3 1 - 4	.50* .55* .52**	.43 .35 .38*	.40 .30 .35*	.38 .37 .37*	.31 -.28 .03

* Significant at the 5% level

** Significant at the 1% level

process.

There are several interpersonal variables which are quite differently related to satisfaction with the group process in the two sets of groups. In Groups 1 & 4, those persons who were most accepted as participants by their colleagues were most satisfied with the group process; the relationship is virtually zero in Groups 2 & 3. In Groups 2 & 3, those participants who perceived their group as unified were most satisfied with their group; in Groups 1 & 4, there is no relationship between perception of unity and satisfaction with group process. In Groups 1 & 4 there is no relationship between the participant's attitude toward the leader as a person and his satisfaction with the group; in Groups 2 & 3, there is a nearly significant tendency for those who like the leader most to be least satisfied with the group process.

These differential relationships indicate that factors which are conducive to satisfaction with group process in one situation may be unrelated in another. This does not mean, however, that the relationships which were found are fortuitous. It seems possible to account for them in terms of the experimental situation. Since the members in Groups 2 & 3 were without material assistance from the leader, and were dependent upon each other, it is understandable that their satisfaction with the group is related to their perception of the unity of the group. Conversely in Groups 1 & 4 where the group process was primarily in the hands of the leader, satisfaction with group process might be expected to be independent of the perception of cohesiveness. The relationship between personal liking for the leader and satisfaction with group process is understandable in the same terms. The leader was well liked in Groups 1 & 4, hence it was

not an important determinant of satisfaction; in Groups 2 & 3, those who liked the leader were in effect, rejecting the group, since the leader and participants were conflicting. The fact that being accepted by one's colleagues is positively related to satisfaction with the group in Groups 1 & 4 and not related in Groups 2 & 3 is harder to explain in terms of the experimental situation. It suggests that in a situation where the leader is supporting and active, the favorable attitude on the part of the members is operative. When the leader is inactive and non-accepting, the attitude of acceptance on the part of the other participants is not an effective determinant of satisfaction with the group. Without the leader's support, being highly regarded by one's colleagues does not affect one's satisfaction.

Satisfaction with leader performance.- Participant satisfaction with the performance of the leader is significantly related, as might be expected, to the extent to which the leader is liked personally. The fact that the correlation is not higher indicates that the participant's estimate of the quality of a performance is not completely a reflection of his attitude toward the person. None of the other interpersonal variables are significantly related to satisfaction with the leader.

Satisfaction with decision.- Four of the five interpersonal variables are significantly related, for all four groups combined, to the participant's satisfaction with the group's decision. The highest correlation is between perception of unity and decision satisfaction. The more unified the participant perceived the group to be, the more satisfied he was. The persons who felt most accepted were also more satisfied than the persons who felt less accepted. Those persons who were actually more

accepted as participants and as persons were more satisfied than those persons who were less highly regarded as participants and as persons.

The relationship between personal liking for the leader and decision satisfaction is quite different in the two sets of groups. In Groups 1 & 4 the correlation is positive; those who liked the leader liked the decision. In Groups 2 & 3, the relationship is negative; those who liked the leader, were less satisfied with the decision. This illustrates again what has been previously said, that there was a conflict in Groups 2 & 3 and the participants who liked the leader rejected the group, and vice versa.

These results indicate that the interpersonal variables are important determiners of the satisfactions of participants. They indicate further that the relationship of an interpersonal variable to satisfactions varies with the total situation. This is especially true for satisfactions with a group process and leader performance. The critical situational difference which accounts for these differential relationships appears to be whether or not the leader and the group are cooperating or conflicting. With respect to satisfaction with decision, however, only one variable, personal liking for the leader, differs in its relationship in the two situations. In both sets of groups the most satisfied participants were those who perceived the group as unified, who felt accepted by others, who were regarded as valuable by their colleagues and were liked by them personally.

2. The relationship of interpersonal variables to delayed measures of participant satisfaction

As has been discussed in the section concerned with satisfaction outcomes, a questionnaire was sent to the participants two months after the

conference. Several of the items in the delayed questionnaire are very similar to the immediate measures of participant satisfaction. The interpersonal variables were correlated with these delayed measures to see whether the interpersonal variables were also related to participant satisfactions after a period of time. The coefficients are presented in Table 18.

The desire for the same group item has no exact counterpart in the immediate questionnaires; hence no comparison of its relationship with the interpersonal variables and an immediate satisfaction item is possible. None of the interpersonal variables are significantly related to desire for the same group for all four groups combined. There is one differential relationship which supports a conclusion which was made earlier, namely, that the participants in Groups 2 & 3 saw the participants and the leader as conflicting, while in Groups 1 & 4 there was no such perception. In Groups 1 & 4 the persons who liked the leader personally tended to want their old group in case of another conference; in Groups 2 & 3, those who liked the leader didn't want the same group; those who did not like the leader wanted the old group.

None of the interpersonal variables are significantly correlated with the extent to which the participants wanted the same leader in the event of another conference, which also has no counterpart in the questionnaires immediately following the meeting. It correlates $+0.53$ with the immediate satisfaction of the participants with the leaders performance, however. The correlation between desire for the same leader and the interpersonal variables may be compared roughly with those obtained between the

TABLE 18

THE RELATIONSHIP BETWEEN INTERPERSONAL VARIABLES AND
DELAYED MEASURES OF SATISFACTION

	Perception of Unity (QIII, 13) (QIV, 1)	Feeling Accepted as a Member (QIV, 8)	Acceptability as Participant to Others (QIII, 9 - QIV, 9)	Acceptability as Person to Others (QIII, 10)	Personal Liking for Leader (QIV, 7)	
Desire for Same Group	1 & 4	-.15	-.02	.27	.13	.45
	2 & 3	+.10	-.07	.18	-.13	-.35
	1 - 4	+.29	-.02	.21	.03	
Desire for Same Leader	1 & 4	.05	.33	-.18	.02	.29
	2 & 3	.18	.14	.23	-.04	.07
	1 - 4	.16	.23	.01	-.02	.20
Satisfaction with Group Process	1 & 4	.44	.00	-.02	.31	-.06
	2 & 3	.53*	.42	.38	.35	-.45*
	1 - 4	.49**	.26	.18	.35*	-.25
Satisfaction with Decision	1 & 4	.17	.06	.39	.17	.27
	2 & 3	.48	.09	.26	.63**	-.15
	1 - 4	.33*	.08	.30	.36*	.13

* Significant at the 5% level

** Significant at the 1% level

interpersonal variables and immediate satisfaction with leader performance. Personal liking for the leader, significantly correlated with immediate satisfaction with the leader, is not related significantly to desire for the same leader. With this exception the relationships of the interpersonal variables to the delayed index of satisfaction with the leader are not significant, as was the case with the immediate measure.

The participants' delayed satisfaction with group process is significantly related to the participants' perception of unity. This is true in both sets of groups for the delayed measure while it was true only for Groups 2 & 3 on the immediate measure. In both sets of groups those who were most accepted personally are most satisfied with the group process after a period of time. There was no relationship between these measures immediately following the conference. The same differential relationship noted for the immediate measure of satisfaction with the group and personal liking for the leader is present with the delayed measure. There is no relationship in Groups 1 & 4 while in Groups 2 & 3, those who were most fond of the leader were least satisfied with the groups' behavior.

The participant's satisfaction with the decision of his group after a period of time is also significantly related to interpersonal variables, although this is primarily the case for the two groups subjected to the negative style of leadership. The more unified the participant felt the group was at the time of the conference, the more satisfied he was with its decision after a period of time. This is primarily true of the participants in Groups 2 & 3. The extent to which the person felt accepted is not significantly related to delayed satisfaction, although it was to his satisfaction immediately after the conference. In both sets of groups those

who were most accepted as participants tend to remain most satisfied, although the coefficient is not quite significant at the 5% level. In Groups 2 & 3, the participants who were best liked were most satisfied, as was the case with the immediate measure. The relationship is also positive in Groups 1 & 4 but lacks statistical significance. As was the case with the immediate measure, those who liked the leader were most satisfied in Groups 1 & 4 and in Groups 2 & 3 those who liked the leader were least satisfied with the group product.

These findings tend to support the conclusion arrived at earlier, that interpersonal variables are important determiners of the satisfactions of participants. They also substantiate the conclusion that the nature of the relationship between interpersonal and satisfaction outcomes varies with the total situation. Finally, the differences between these relationships and those found between interpersonal variables and immediate measures of satisfaction illustrate that a variable may be significantly related to immediate satisfaction and not be related to satisfaction after a period of time.

3. The relationship of interpersonal variables to decision quality

Table 19 shows the interrelations of the interpersonal variables and the measure of decision quality, the external criterion score. The coefficients are reported for the four groups combined; there were no significant differences in the degree of relationship in the two sets of groups. The general import of the table is that none of the interpersonal variables are significantly related to the measure of quality.

This general negative finding achieves some significance when

TABLE 19

THE RELATIONSHIP BETWEEN INTERPERSONAL VARIABLES AND MEASURES OF INDIVIDUAL SOLUTION QUALITY

	Perception of Unity (QIII, 13) (QIV, 1)	Feeling Accepted as a Member (QIV, 8)	Acceptability as Participant to Others (QIII, 9 - QIV, 9)	Acceptability as Person to Others (QIII, 10)	Personal Liking for Leader (QIV, 7)
Criterion Quality Score	-.08	.18	.12	.21	.27

discussed in connection with some very plausible hypotheses. It might well be expected, for example, that those persons who were regarded as most valuable would have higher quality solutions. In line with current educational theorizing, one might expect that those individuals who felt most accepted and were best liked personally would show higher quality solutions, since the atmosphere for them was conducive to acquisition of information. One coefficient which comes very close to being significant suggests that those who were most fond of the leader tend to produce higher quality solutions, as measured by the external criterion score. This is in line with the common notion concerning the value of identifying with the teacher, or leader, when acquisition of knowledge is desired.

The general conclusion is that the quality of the individual's solution is not significantly related to his perception of unity of the group, the extent to which he felt accepted, the extent to which he was accepted as a participant and as a person, or to his personal liking for the leader.

II. Problem-Solving Behavior

A. Introduction

The process of problem-solving by a group has traditionally been treated from the standpoint of stages of thinking along the lines indicated by Dewey(5,p.68). Dewey sets up the following stages in the problem-solving process: a felt difficulty, its location and definition, suggestion of possible solutions, development of logical results of suggestions and, finally, further observation and experimentation leading to acceptance or rejection. In general, this type of approach has not been productive in preliminary studies by the Conference Research staff. Clear out stages such as problem-formulating, solution-forming, and decision-evaluating do not appear. The typescripts of groups in problem-solving situations indicate that there is much retracing of steps, with one stage shading into another until their boundaries are unreliably determined.

In the light of this experience, the analysis of the problem-solving process in this experiment was approached somewhat differently. It was posited that in order to solve a problem and arrive at a decision, a group must perform certain problem-solving functions. Thus, for example, information must be presented to the group, problems must be stated, and solutions must be proposed. It also seemed possible to indicate what on theoretical grounds would be an optimum sequence of functions from the standpoint of producing high quality decisions. There were no a priori notions as to the optimum frequency of each function for a single individual but with reliable categorization of each contribution in terms of its function in the problem-solving process, such an optimum frequency for each

type of functional unit for a particular kind of outcome might be determined. On the basis of this thinking, an attempt was made to categorize each contribution in terms of its problem-solving function. The category system used was a modification of one which had been pre-tested in a previous experiment. The following discussion describes first the methodological problems which were met in connection with typescript coding and finally deals with the effects of the leadership style variation on the problem-solving behavior of the groups.

B. Methodology

1. Reliability of unit designation

Guetzkow⁽⁸⁾ points out that the first task in coding is to define the limits of the unit which is to be coded. Self-consciously here, the attempt was made to define or identify these units on the basis of the list of categories that were to be applied to the data. The following definition of a unit was decided upon: a subject-predicate unit classifiable into a single category. A sequence of words is a unit even though the preceding subject-predicate unit is classified into the same category. These principles are very similar to those used in the analysis of interaction of the Basic Skills and Training Groups at the First National Laboratory in Group Development.⁽¹⁾ These units are referred to in the remainder of this report as contributions or functional units. The term participation refers to a series of words, phrases, or sentences by an individual which occurs between the remarks of other members of the discussion group. Thus, the functional unit of contribution is in most

cases a sub-unit of a participation. We may have, for example, a single participation consisting of four contributions: three information giving and one supporting.

After preliminary discussion and training, two analysts showed 90% agreement as to the boundaries of units on completely new material. The total number of items was 280. This per cent agreement figure was computed as follows: when the beginning and end of a unit were agreed upon, it was counted as one agreement; when there was disagreement as to the end of the next unit, a disagreement was recorded. The next coincidence of beginning and end notations counted as another agreement. The total number of units is equal to the number on which there was agreement plus the number on which there was disagreement.

This 90% agreement figure was checked by having the analysts independently unitize a complete typescript. On 533 items, there was agreement as to the boundaries of 92% of the items. Of the 43 items on which there was disagreement, 88% involved decisions as to whether or not an additional phrase or clause was necessary in order for the item to be classifiable into a single category. In other words, only a few involved the problem of whether or not a single word constituted a classifiable unit.

It is apparent that the designation of units can be made reliably. This finding is very important from the standpoint of obtaining reliability in categorization, since it is quite likely that the latter type of reliability is very sensitive to unit unreliability. That is, disagreements between coders as to the proper category to apply to a contribution increases when units are incorrectly designated, especially as regards the "single category" stipulation in the unit definition. When a designated

unit actually contains two classifiable units, one coder may classify on the basis of one unit and the other on the basis of another unit, thus reducing the amount of agreement between coders.

2. Content categories

Previous examination of typescripts had suggested that it was possible to distinguish two types of subject matter. One area is defined by the topic(s) under discussion, the agenda item(s). The other subject matter area is the group process itself. In other words, some contributions are concerned solely with substantive material, with the topic area and relevant substantive areas (Category S). Other contributions have as their subject matter the procedure of the group, or aspects of the group's procedure (Category P). Of course, a mixed category is necessary to accommodate contributions which contain references both to the procedure of the group and to the substantive material (Category M).

To determine the reliability with which these distinctions could be made, two coders classified 424 items, 20% of the contributions in the typescripts of Groups 2, 3 & 4. The coders agreed on 372, or 88 per cent. This high degree of reliability is reflected in the scores describing the total problem-solving process of the group. For the conference of Group 2, coded in its entirety by both coders; the average discrepancy between coders per category was less than 2%. This same level of slight disagreement prevailed throughout the coding process and indicates that the distinctions can be made reliably.

3. Definitions of problem-solving functional categories

Most of the categories used were derived from previous typescript-coding experience by the staff of Conference Research. Additional

categories come from theoretical considerations. All the problem-solving function categories may be applied to any contribution, whether purely substantive, purely procedural or mixed. This is, in effect, saying that there are at least two problems facing any group: the problem posed by the agenda item and the problem posed by the group process itself. Thus, there can be contributions which set goals in the area of the agenda item; there can also be goal-setting contributions in the area of group procedure. Similarly, a participant can seek information in the area of the topic under discussion; he can also seek information about the group's procedure. Illustrations of the same problem-solving function in the two subject matter areas are given in the list of definitions of the categories which follows:

Goal Setting: These contributions have the function of establishing or suggesting goals or objectives, both procedural and content. They are concerned with ends to be attained. These objectives, goals or ends may be those of the individual, which he is trying to have the group attain; they may consist of statements of accepted goals of the group or part of the group.

Illustrations:

Substantive - "We will want to attract experienced men."

Procedure - "We want to settle this question as quickly as possible."

Problem Proposals: These contributions serve the function of presenting a problem, either in content or procedure. These contributions are concerned with means to ends or goals.

Illustrations:

Substantive - A goal or objective has been stated or implied, such as, "We want experienced men." The problem proposal might be stated:

"Shall we use a higher salary than our competitors or shall we give a higher incentive than our competitors?"

Procedure - "How can we keep this discussion from going on too long."

Information Seeking: These contributions have the function of seeking to obtain information of an objective, factual or technical nature. The information sought is from the area of fact on which the group decision is to be based. Contributions seeking factual, objective or technical information concerning the procedure of the group or an individual are classified here.

Illustrations:

Substantive - "What do our competitors pay?"

Procedure - "How much time do we have?"
"Are you disagreeing with Jones?"

Information Giving: These contributions have the function of providing objective, factual, or technical information, either in the subject area or with respect to procedure. The category includes the citing of examples or illustrations.

Illustrations:

Substantive - "It will cost 12,000 dollars to build a building."

Procedure - "I am trying to get Jones to state his ideas more clearly."

Solution Proposals: These contributions serve the function of indicating solutions to problems. They are suggested means to ends. Modifications of or additions to solution proposals previously offered are classified in this category if the context gives the contribution a solution proposing function.

Illustrations:

Substantive - "We could have a base salary plus a bonus based on sales."

Procedure - "Let's take the problems in order of difficulty."

Development Seeking: These contributions serve the function of attempting to obtain clarification of previous contributions. They seek to determine what was intended by a previous contribution, what its implications are, what inferences are permissible. These frequently take the form of an inference stated as a question.

Also included here are contributions which facilitate the procedure of the group by asking the group as a whole or individuals, to comment, indications to individuals that they have the floor, etc.

These are primarily procedural development-seeking, either mixed or pure. These are stimulating contributions.

Illustrations:

Substantive - You feel we should have higher standards?

Procedure - Do any of you have any comments on that point?

Development Giving: Contributions here elaborate, make explicit, enlarge on contributions. Included here are: inferences from previous contributions, self-repetitions or restatements by others of previous contributions; reflecting types of contributions which are distillations of previous contributions without functioning to get clarification, but are, rather, declarative statements of what the previous contribution stated or implied. Finally, this category includes contributions which provide the rationale, reasons or arguments for the individual's positions. They give his reasons for his saying what he does.

Illustrations:

Substantive - That way we could get maximum returns on our investment.

Procedure - By doing that we can make these decisions more quickly.

Opposing: These contributions are characterized by an opposition, resistance to, or disagreement with a suggestion, solution, interpretation, etc. Responses which point out obstacles, difficulties, or objections are included here.

Illustrations:

Substantive - I don't think we can afford to pay that much.

Procedure - We should not be taking up these problems in order of difficulty.

Supporting: These contributions serve the function of indicating agreement or approval of a suggestion or solution proposal. Included here are indications of approval of the fact that another has contributed whether approval of content is present or not. This is a supporting comment in procedure.

Illustrations:

Substantive - I agree that we must pay more than our competitors are paying.

Procedure - Jones has an interesting proposal.

Summarizing Seeking: These contributions ask, in effect, for a summary, e.g., "I'm lost, where are we now?"

Illustrations:

Substantive - "Are we planning to have 48 men supervised by a board of directors?"

Procedure - "What have we decided?"

Summarizing Giving: These contributions summarize the group, or part of the group's, progress to date. They refer either to substantive material discussed over a period of time, conclusions reached or to the group's procedure over a period of time. Summary statements of individual participations are not included here.

Illustrations:

Substantive - "So we will pay them a base salary, equal to our competitors and add a bonus based on sales."

Procedure - "We have been exploring the problem and examined several possible solutions."

Non-Problem Directed: This category included irrelevancies of the tangential sort and a myriad of responses of an interpersonal sort, such as "give me the ash tray", and "how about opening a window". It includes statements which have no reference to the subject matter of the conference nor to the group procedure.

This system of categories is very similar to the group-task and group-building role classification system used by Berne and Sheets,⁽⁴⁾

All of the functions those researchers felt were necessary to describe group discussions are included in the above list of problem-solving functions.

The instructions given the coders, together with a more elaborate description of each of the categories are given in Appendix E.

4. The reliability of the coding of the problem-solving process

The reliability of contribution coding.- Two coders were trained in the use of the categories on the typescript of Group 1. The general

training procedure, after the categories had been thoroughly discussed, consisted of a period of independent coding of small samples by each of the three coders followed by a discussion of disagreements after each sample. The main task in such a session was to provide a common frame of reference for the three coders. The most successful frame of reference, as determined by percentage agreement among the coders, was provided by the theory underlying the category system. As has been pointed out, the central notion in the category system is that each contribution performs some function in the group problem-solving process. The category definitions define those functions.

Two general problems became clear during the coding conferences: the context problem and the intent problem. Analysis of reasons for disagreement between coders indicated that the coders were using different contexts in determining the function of a contribution. A particular contribution might operate functionally to develop a previous contribution. The function of the previous contribution being developed by it might be to oppose an earlier contribution. One coder would classify the contribution as development-giving and another coder as an opposing contribution. This is a problem of levels of function or a context problem. In the immediate context, taking only the previous contribution into account, the contribution functions as a development-giving one. In a larger context, it is an opposing contribution. Problems such as these were met by adopting the larger frame of reference - by determining for each contribution its contribution in the total problem-solving process. This larger frame of reference permitted the coder to note the functional effect of the contribution when classifying it.

The coders differed in the extent to which they sought to determine the intent of the person making the contribution. What function was he trying to perform, what was he trying to do? The extent to which a judgment as to intent should be permitted to enter into the coder's frame of reference depends on the purpose for which the material is being analyzed. Since we had no theoretical notions at the time of coding as to the relation between the functional intention of participants and other variables and since we were interested in the description of the problem-solving process, the decision was made to reduce as much as possible any attempt to evaluate intent when determining the function of a contribution. The question above was reformulated to, "Regardless of what the participant was trying to do, what did his contribution do in the problem-solving process?"

The original objective of training was to obtain 90% agreement between coders. The training process threatened to become impossibly long, however, and was terminated when the average per cent agreement figure was in the low 80's for a series of samples of 100 items. On completely new material, the typescripts of the conferences of Groups 2, 3 and 4, one coder coded the entire typescript while another coded approximately 20 per cent of each typescript. The two coders agreed on 73% of 205 items in the Group 2 typescript, on 75% of 93 items in Group 3, and 71% of 126 items in the typescript of Group 4. The per cent agreement figure combining all samples is 73%. This value indicates that the probability of the coder making a correct classification would be less than 73% one time in 100. The chances are 99 out of 100 that the probability of correct classification is between .79 and .91(8). These results indicate that the function of

individual contributions can be coded with moderate reliability.

The reliability of group problem-solving scores.- Guetzkow(8) has pointed out that the critical reliability figure should be obtained for the level at which the coded index is to be used. The actual problem-solving scores which were used in analysis were total descriptions of the problem-solving behavior of each individual. The amount of disagreement between two coders on particular items is not of great importance if their over-all description of group and individual behavior is similar. In this section the nature and reliability of these types of scores will be discussed.

After each sample the discrepancy between the percentage of contributions which were classified in each category by each coder was determined. The average per cent discrepancy per category for a series of eight samples of varying sizes and for one entire typescript was 1.53. This value was obtained on a total of 1545 items.

When the twelve categories are ranked in terms of incidence of contributions by the two coders, the rank-order correlations range from .98 to .81. Eight of the nine correlations are between .91 and .98.

These findings with respect to reliability indicate that the category system provides highly reliable descriptive measures of the group problem-solving process. The categories themselves are approximately equal in coding difficulty, although there is some indication that the category used most frequently, development giving, is slightly more difficult to code than are the others. The other disagreements between pairs are randomly distributed.

The reliability of individual problem-solving scores.- With each

contribution coded in terms of the problem-solving function served by it, it is possible to describe the problem-solving behavior of each person. There are two meaningful scores for each person. One is the percentage of his total number of contributions which fall in each problem-solving category. These are referred to as "% Own" scores in the following discussion. The other score is the percentage of the total number of contributions classified in each category which is accounted for by the participant. These scores are referred to as "% Category" scores. The meaning of these two types of scores may be made clear by the following illustration:

Data: Participant 1 has the following % Own scores in three categories: Opposing, 30; Solution-Proposing, 50; Information-Giving, 20. His % Category scores in the same three categories are: Opposing, 90; Solution-Proposing, 10; Information-Giving, 90.

Interpretation: Participant 1 performed only three kinds of functions during the conference. Half of his contributions were solution proposals; almost one-third were opposing contributions; one-fifth were information-giving.

From the standpoint of the group, Participant 1 provided most of the information and did most of the opposing. In spite of the large proportion of his contributions which were solution proposals, he actually made only a small proportion of those which were made.

The % Own figure in a given category is therefore the percentage of the participant's contributions which belong in that category; his % Category score for the same category is the percentage of such contributions which were made by him.

Data as to the reliability of these scores come from two sources. Twenty individuals were selected at random from among the 38 participants

and the contributions of each were classified by the two coders. This is an adequate basis for checking the reliability of the % Own scores but is slightly less adequate for the % Category scores since the number of contributions in each category was obtained for only one coder. However, it was noted above that the percentage of contributions in each category was very similar for the two coders, and the error introduced by using one coder as the base for the other is probably very slight.

The % Own and % Category scores assigned by both coders for each of the participants on each of the twelve categories were computed. The average percentage discrepancy per person and per category was determined. The results of this analysis are shown in Table 20. The two coders differed from each other by about two percentage points on the average for any category score for an individual.

The data from the 20 individuals were also treated by the correlation method. The scores assigned by each coder to each participant were correlated for the nine categories in which there was a sizeable incidence of contributions. The correlation coefficients are shown in Table 21. They indicate a high degree of agreement between the two coders for almost all categories. The coefficients tend to be highest for those categories on which there were a large number of contributions. While the correlations are reported for only the % Own scores, similar coefficients would be expected for the % Category scores, due to the small differences between coders in the percentage of contributions assigned to each category.

Another reliability check is provided by the data from the conference of Group 2, the whole typescript of which was coded by the check coder. On ten subjects, the average difference in percentage per

TABLE 20

THE DISCREPANCY BETWEEN PROBLEM SOLVING SCORES ASSIGNED BY
CODER L AND CODER K TO 20 PARTICIPANTS

	% Own Scores				Total Av.
	A - 1	A - 4	A - 2	A - 3	
Average Discrepancy per Person	22	43	19	24	26
Average Discrepancy per Category	1.8	3.6	1.6	2.0	2.2
	% Category Scores				Total Av.
	A - 1	A - 4	A - 2	A - 3	
Average Discrepancy per Person	17	15	17	29	20
Average Discrepancy per Category	1.4	1.3	1.4	2.4	1.7
Number of Persons	6	4	4	6	20

TABLE 21

CORRELATION BETWEEN % OWN SCORES ASSIGNED BY TWO RATERS
TO 20 PARTICIPANTS

Goal Setting	.83
Information Seeking	.97
Information Giving	.73
Solution Proposing	.79
Development Seeking	.85
Development Giving	.76
Opposing	.87
Supporting	.92
Summary Giving	.83

score was 2.0 with a range of .75 to 8.5 percentage points for the % Own score, and 2.4 with a range of 1 to 4.6 percentage points for the % Category score.

It is apparent from these findings that the two kinds of individual problem-solving scores are highly reliable in terms of coder agreement.

5. Summary of methodological findings

The results presented indicate that:- (1) the functional units, or contributions are reliably identified; (2) the problem-solving function performed by each contribution is determined with moderate reliability; (3) the individual and group measures of problem-solving functions are highly reliable; and (4) the subject matter distinctions - whether a contribution is procedural, substantive or a mixture of both - can be reliably made.

C. Experimental Findings

1. Description of the group problem-solving process.

The classification of contributions permits an overall description of the functions performed during the conference and the frequency of each function. The description below will serve to illustrate the value of the technique as well as provide information concerning the problem-solving behavior of the experimental groups.

Table 22 shows the percentage of contributions which were classified in each problem-solving category, for each of the four groups. The table also shows the category distributions separately for pure substantive, mixed and pure procedural contributions as well as for all types combined. Table 23 shows the number of contributions in each

TABLE 22

THE PERCENTAGE OF TOTAL CONTRIBUTIONS IN EACH PROBLEM-SOLVING CATEGORY

	Goal Setting	Prob. Propos.	Inf. Seek.	Inf. Giving	Solu. Propos.	Devel. Seek.	Devel. Giving	Oppos. Support	Summ. Givng	Summ. Non-Prob. Directed	Number of Contributions
A - 1	S	4	1	1	6	5	28	7	8		59
	M		1	1	3	8	7	1	5	2	31
	P	2	1	1	1	5	1	1	3		10
Total		4	2	3	9	17	35	9	15	3	511
A - 4	S	1	1	4	8	5	28	14	7	1	70
	M	1	2	1	2	6	4	3	3	2	25
	P					1			3		5
Total		2	4	6	10	12	32	17	12	3	616
A - 2	S	3	1	4	7	4	27	19	6		71
	M	1	2	3	3	3	6	5	3	1	28
	P							1			1
Total		4	3	7	10	8	32	24	9	1	530
A - 3	S	2	2	8	2	2	30	15	6	1	67
	M	1	1	4	6	3	3	7	5		31
	P								1		2
Total		3	2	4	13	8	34	22	11	2	474
All Groups	S	2.4	1.2	3.0	6.9	4.1	28.3	13.5	6.7	.1	67
	M	.5	1.6	1.8	2.9	5.6	4.9	3.9	3.7	.2	28
	P	0.0	.1	.4	.2	1.6	.1	.5	1.6	.2	5
Total		2.9	2.9	5.3	10.1	11.3	33.3	17.9	11.9	.4	2131

TABLE 23

THE NUMBER OF CONTRIBUTIONS IN EACH PROBLEM-SOLVING CATEGORY

Goal Setting	Prob. Propos.	Inf. Seek.	Inf. Giving	Solu. Propos.	Devel. Seek.	Devel. Giving	Oppos.	Support.	Summ. Seek.	Summ. Giving	Non-Prob. Directed	N
A - 1 S	18	2	0	7	29	23	145	42	0	0	1	301
M	2	10	7	7	13	40	35	23	2	12	0	158
P	0	0	0	3	25	1	1	13	1	2	1	52
Total	20	12	7	17	45	88	181	78	3	14	2	511
A - 4 S	8	4	12	26	46	31	173	41	0	4	1	431
M	2	8	13	7	12	37	25	17	0	12	1	152
P	0	0	1	2	1	5	0	17	2	1	2	33
Total	10	12	26	35	59	73	198	75	2	17	4	616
A - 2 S	16	0	6	22	34	23	142	33	0	0	1	375
M	3	6	11	15	17	17	29	16	0	7	0	146
P	0	0	0	2	0	2	0	1	0	0	1	9
Total	19	6	17	39	51	42	171	50	0	7	2	530
A - 3 S	9	1	7	10	39	10	144	26	1	0	0	318
M	3	2	4	10	21	26	15	22	2	6	1	145
P	0	0	0	1	1	2	0	3	1	1	0	11
Total	12	3	11	21	61	38	159	51	4	7	1	474
All Groups Combined	51	7	25	65	148	87	604	288	1	4	3	1425
	10	26	35	39	63	120	104	78	4	37	2	601
P	0	0	1	8	5	34	1	34	4	4	4	105
Total	61	33	61	112	216	241	709	254	9	45	9	2131

category, on which Table 22 is based.

All of the groups showed a negligible incidence of non-problem directed, summary-seeking and problem-proposing contributions. Information-seeking, information-giving, and summary-giving contributions account for only a small percentage of the total, as did goal-setting and problem-proposals. For all groups, approximately a third of the contributions developed a preceding contribution (making inferences, elaborating, repeating and restating, providing rationale for position). Most of the problem-solving process for all groups can be described in terms of the functions of seeking development of previous contributions, of developing previous contributions, proposing solutions and of opposing and supporting the content of contributions.

For all groups combined, about two-thirds of the contributions concerned material relevant to the agenda item - remuneration policy for managers of a grocery chain. Slightly more than one-quarter contained references both to the agenda item and to group procedure. Only 5% of the contributions referred solely to aspects of group procedure. Table 24 presents the same data as are shown in Table 22, except that all content differentiations are omitted and the percentages of Groups 1 & 4 and Groups 2 & 3 are combined.

The manipulation of leadership style produced a number of differences between sets of groups in the frequency with which certain functions were performed, regardless of subject matter. Groups 1 & 4 show a significantly greater percentage of supporting and development seeking contributions than do Groups 2 & 3. These differences are significant at the 1% level.

TABLE 24

PERCENTAGE OF CONTRIBUTIONS IN EACH CATEGORY

Goal Setting	Prob. Seek.	Inf. Giving	Inf. Propos.	Solu. Seek.	Devel. Giving	Devel. Oppos.	Support. Giving	Summ. Seek.	Summ. Non-Prob. Giving	Number of Contributions			
A-1	4	2	1	3	9	17	35	9	15	1	3	0	511
A-4	2	2	4	6	10	12	32	17	12	0	3	1	616
A-2	4	1	3	7	10	8	32	24	9	0	1	0	530
A-3	3	1	2	4	13	8	34	22	11	1	2	0	474
1 & 4	2.7	2.1	2.9	4.6	9.2	14.3	33.9	13.2*	13.6	.4	2.8	.5	1127
2 & 3	3.1	.8	2.8	6.0	12.2	8.0	32.9	22.5	10.0	.4	1.3	.3	1004

* Difference 1 & 4: 2 & 3 significant at 5% level
 ** Difference 1 & 4: 2 & 3 significant at 1% level
 + Difference between Group 1 and Group 4 is significant at the 1% level

Groups 2 & 3, on the other hand, made a significantly higher percentage of opposing and solution-proposing contributions. Although in Group 1 there was a significantly lower relative evidence of opposing contributions than in Group 4, Group 4 also differs significantly at the 1% level from Groups 2 & 3 in the amount of opposing contributions. The positive leadership style produced less conflict and a greater amount of searching for clarification and understanding of what others were saying than did the negative style. None of the other differences between sets in the extent to which functions were performed is statistically significant.

To evaluate the quality of the problem-solving process, three members of the staff independently assigned what they considered to be optimum frequencies for each of the 12 categories. The correlation between ranks assigned the categories by the three pairs of raters were .88, .66 and .79. The average rank assigned by the three raters to each category was compared with the ranking of the category in order of frequency of use in each of the four groups. The rank-order correlation coefficients are .51 for Group 1 and .72 for Group 4; .58 and .59 for Groups 2 & 3 respectively. From the standpoint of this criterion the two sets of groups did not differ in quality of their problem-solving process. The discrepancy per category between optimum frequency and obtained frequency was approximately 5%, in each of the four groups. The main points of disagreement were in the information-giving and seeking categories where the groups did much less than the theoretically optimum frequency and in the opposing categories, where the groups did much more than the three staff members thought was optimal.

2. The problem-solving behavior of the leader

The experimental design dictated that the leader behave differently in the two sets of conferences. The functional analysis provides a means of determining the extent to which the leader modified his behavior and the direction of such modifications, if any.

The problem-solving behavior of the leader is shown in Tables 25 and 26. Table 25 shows the percentage of contributions in each problem-solving category accounted for by the leader. This is the % Category score referred to in the discussion of individual problem-solving scores. None of the differences between groups within a set are significant. The leader's behavior in the two situations, however, was significantly different at the 1% level for nine of the twelve categories. In Groups 1 & 4, the leader accounted for a significantly greater percentage of the goal-setting, problem-proposing, solution-proposing, development-seeking and giving, supporting, summarizing-seeking and giving contributions that were made than he did in Groups 2 & 3. He accounted for a significantly greater percentage of opposing contributions in Groups 2 & 3 than he did in Groups 1 & 4. The leader in Groups 1 & 4, in contrast to his behavior in the Groups 2 & 3 situation, accounted for a higher percentage of directing and guiding functions. He did more of the supporting and less of the opposing than he did in Groups 2 & 3. The percentage of the total number of contributions which were accounted for by the leader in each group is also shown. The leader made a significantly greater percentage of the contributions in Groups 1 & 4 than in Groups 2 & 3.

Table 26 uses the total number of contributions by the leader in each conference situation as a base and shows the distribution of his

TABLE 25

PERCENTAGE OF CONTRIBUTIONS IN EACH CATEGORY WHICH WERE ACCOUNTED FOR BY LEADER (% CATEGORY SCORE)

	Goal Setting	Prob. Propos.	Inf. Seek. Giving	Inf. Giving	Solu. Propos.	Devel. Seek. Giving	Devel. Oppos.	Support.	Summ. Seek. Giving	Summ. Non-Prob. Directed	% of Total Contributions		
A - 1	30	83	43	0	13	75	18	7	37	33	64	100	33
A - 4	10	67	39	6	9	55	11	1	24	50	71	50	20
A - 2	0	0	41	10	0	38	2	10	0	0	29	0	8.5
A - 3	0	33	9	5	0	53	4	9	6	0	14	100	9
1 & 4	23.4	75	39.4	3.8	10.6	66	14.2	2.7	32.9	40	67.8	66.7	25.6
2 & 3	0	11.1	28.5	8.3	0	45	3.0	9.1	2.9	0	21.4	33.3	8.8
	**	**	**	**	**	**	**	**	**	**	**	**	**

** Difference 1 & 4: 2 & 3 significant at the 1% level

TABLE 26

PERCENTAGE OF LEADER'S CONTRIBUTION
IN EACH CATEGORY
(% OWN SCORE)

	Goal Setting	Prob. Propos.	Inf. Giving	Inf. Giving	Solu. Propos.	Devel. Seek.	Devel. Giving	Oppos. Support.	Summ. Seek.	Summ. Giving	Non-Prob. Directed	
A - 1	4	6	3	0	4	39	20	2	17	1	5	1
A - 4	1	7	8	2	4	33	18	1	15	1	10	2
A - 2	0	0	16	9	0	36	9	27	0	0	4	0
A - 3	0	2	2	2	0	47	14	21	7	0	2	2
1 & 4	2.4	6.2	4.5	1	3.8	36.8	18.7	1.4	16.2	1	7.3	1.4
2 & 3	0	1.1	8.6	5.7	0	40.9	11.4	23.9	3.4	0	3.4	1.1

* Difference 1 & 4: 2 & 3 significant at the 5% level

** Difference 1 & 4: 2 & 3 significant at the 1% level

contributions over the problem-solving categories. This is the leader's % Own score. The leader was consistent in his behavior within leadership style conferences, but differed significantly in the two leadership style situations. He did relatively more problem-proposing, more solution-proposing and did more supporting in Groups 1 & 4 than in Groups 2 & 3. He supplied relatively less information and made fewer opposing contributions in Groups 1 & 4 than in Groups 2 & 3.

It is apparent that the leader styles were markedly different in the two situations. He differed in the extent to which he participated, in the functions he performed and in the extent to which he was responsible for those functions. In almost every detail, the behavior corresponded to that which was prescribed for the leader as the experimental design. (See Experimental Design and Procedure)

The behavior prescribed in the experimental design for the leader in Groups 1 & 4 would, on theoretical grounds, have beneficial effects upon problem-solving process. The goal-setting function would serve to keep the goal clearly in mind; problem-proposing on the part of the leader would help to ensure a realistic solution; information-seeking by the leader would ensure that the group's informational resources would be tapped. Information-giving as well as solution-proposing were not prescribed for the leader, the notion being that the leader should not act as an expert, in either situation. The development-seeking function was prescribed because of a hypothesized stimulating effect. The leader was instructed to support and accept rather than oppose in order to encourage participation and create an atmosphere of freedom. The leader's summarizing seeking and giving functions would, it was believed, have

beneficial effects on the group's procedure, making the participants aware of what was going on in the problem-solving process. The data in Tables 25 and 26 indicate that in Groups 1 & 4 the leader performed these functions which were believed to facilitate the problem-solving behavior of the group to a significantly greater extent than he did in Groups 2 & 3. In the latter situation, he performed almost no helpful function and did more than his share of opposing and obstructing.

In summary, then, the two sets of groups, combining the behavior of the leader and the members, differed from each other in the extent to which certain functions were performed and also in the manner in which the leader behaved. The question which next arises is whether the difference in leader behavior had any effect on the participants in the two situations. Are there differences in the participant behavior concomitant with the leader differences? Or are all the differences between conference groups due to differences in leader behavior?

3. The problem-solving behavior of the participants

Table 27 shows the percentage of the contributions made by the participants classified in each problem-solving category for each of the four groups and the two sets of groups. This is actually a % Own score for the participants as a group. It is apparent that the four groups are very similar in their distribution of functions. On only one of the twelve categories is the difference in per cent between sets of participants statistically significant. The participants in Groups 2 & 3 did relatively more opposing than did participants in Groups 1 & 4. However, this difference is due to the relatively low amount of opposing in Group 1,

TABLE 27

PERCENTAGE OF PARTICIPANTS' CONTRIBUTIONS
IN EACH CATEGORY
(% OWN SCORE)

	Goal Setting	Prob. Propos.	Inf. Seek.	Inf. Giving	Solu. Propos.	Devel. Seek.	Devel. Giving	Oppos.	Support.	Summ. Seek.	Summ. Giving	Summ. Non-Prob. Directed
A - 1	4.1	.6	1.2	5.0	10.8	6.4	43.3	12.0	14.3	.9	1.5	0
A - 4	1.8	.8	3.2	6.7	10.9	6.7	35.8	21.0	11.5	.2	1.0	.4
A - 2	3.9	1.2	2.1	7.2	10.5	5.4	34.4	23.5	10.3	0	1.0	.4
A - 3	2.8	.5	2.3	4.6	14.2	4.2	35.5	22.5	11.1	.9	1.4	0
1 & 4	2.7	.7	2.4	6.0	10.9	6.6	38.9	17.3*	12.3	.5	1.2	.2
2 & 3	3.4	.9	2.2	6.0	12.2	4.8	35.0	23.0	10.7	.4	1.1	.2

** Difference 1 & 4: 2 & 3 significant at the 1% level

+ Difference between Group 1 and Group 4 is significant at the 1% level

**

which differs significantly from Group 4. This single difference between sets of participants is therefore not traceable to the leadership style difference since the leader behaved similarly in Group 1 and Group 4. In spite of the marked differences in leader behavior under the two sets of conditions, the groups were virtually identical in the kinds of functions they performed and in the relative frequency with which each function was performed.

While the groups, excluding leader, did not differ materially in the patterning of their contributions, i.e., in the percentage of contributions by the participants classified in each category, there is marked difference in the percentage of contributions in each category which were accounted for by the group. This inference can be made from Table 25. Since the leader in Groups 1 & 4 performed certain functions to a significantly greater extent than he did in Groups 2 & 3, it follows that the participants in Groups 2 & 3 were more responsible for these same functions than the participants in Groups 1 & 4. In Groups 2 & 3 the participants accounted for a significantly greater percentage of the guiding and directing behavior, such as goal-setting, problem-proposing, development-seeking, and summarizing-giving.

This is also apparent from Table 28 which shows the percentage of the total number of contributions which were made by the leader and by the group classified according to category. For example, in Groups 1 & 4, 9.4% of the contributions were development-seeking contributions by the leader; in Groups 2 & 3 only 3.6% of the contributions were development-seeking contributions by the leader. This table helps to explain the differences between sets of groups in the amount of solution-proposing,

TABLE 28

PERCENTAGE OF TOTAL CONTRIBUTIONS ACCOUNTED FOR BY LEADER AND BY THE PARTICIPANTS CLASSIFIED ACCORDING TO FUNCTIONAL CATEGORY

	Goal Setting	Prob. Propos.	Inf. Seek.	Inf. Giving	Solu. Propos.	Devel. Seek.	Devel. Giving	Oppos. Support.	Support. Seek.	Summ. Non-Prob. Directed	Total	
A - 1:												
Leader	1	1.9	.6	0	1.2	13.0	6	.6	5.7	.2	1.7	.4
Participant	3	.4	.8	3.3	7.6	4.0	29.0	8.0	9.6	.6	1.0	0
A - 4:												
Leader	1	1.3	1.6	.3	.8	6.5	3.4	.1	2.9	.1	1.9	.3
Participant	5	.7	2.6	5.4	8.8	5.4	28.7	16.9	9.3	.2	.8	.3
A - 2:												
Leader	0	0	1.3	.8	0	3.0	.8	2.3	0	0	.4	0
Participant	3.6	1.1	1.9	6.6	9.6	4.9	31.5	21.5	9.4	0	.9	.4
A - 3:												
Leader	0	.2	.2	.2	0	4.2	1.3	1.9	.6	0	.2	.2
Participant	2.5	.4	2.1	4.2	12.9	3.8	32.3	20.5	10.1	.8	1.3	0
1 & 4												
Leader	.6	1.6	1.1	.2	1.0	9.4	4.8	.4	4.2	.2	1.9	.3
2 & 3												
Leader	0	.1	.8	.5	0	3.6	1.0	2.1	.3	0	.3	.1
1 & 4												
Participant	2.1	.5	1.8	4.4	8.2	4.9	28.9	12.9	9.4	.2	.9	.2
2 & 3												
Participant	3.1	.8	2.0	5.5	12.2	4.4	31.9	21.0	9.8	.4	1.1	.2

** Difference 1 & 4: 2 & 3 significant at the 1% level

development-seeking, supporting and opposing which were reported in Table 24. It is apparent from Table 28 that the difference in the amount of solution-proposing is due primarily to more solution-proposing on the part of the participants in Groups 2 & 3. The difference in favor of Groups 1 & 4 in amount of development-seeking is due primarily to the leader; the participants in the two sets of groups do not differ in amount of development-seeking. The higher incidence of opposing contributions in Groups 2 & 3 is attributable to both leader and participants, especially the latter. The higher percentage of supporting contributions in Groups 1 & 4 is due entirely to the leader; the participants do not differ in this respect.

In summary, then, the leadership style differences produced significant differences between the sets of groups including the leader in the incidence of four of the twelve functions. Two of these differences are due almost exclusively to differences in leader behavior; two are due primarily to participants. However, it is apparent from Tables 24, 25 and 28 that the leader behaved very differently in the two situations. The general effect of the differences was that the participants in Groups 2 & 3 performed the guiding and directing functions to a significantly greater extent than did the participants in Groups 1 & 4. The groups did not differ materially, however, in their patterning of contributions; that is, using their own total contributions as a base, they differed in the relative incidence of only one of the twelve functions.

This finding is quite striking when related to two popular hypotheses about the relations between the leader and the group. One hypothesis is that the participants reflect the behavior of the leader.

The other hypothesis is that the participants will fill the "gap" left by the leader's failure to perform certain functions. The crucial data for evaluating these hypotheses are shown in Table 27. Since the leader did significantly more problem-proposing in Groups 1 & 4 the reflecting hypothesis predicts that the participants in these groups would do relatively more problem-proposing than the participants in Groups 2 & 3. The same prediction would be made for all functions performed by the leader significantly more frequently or significantly less frequently in one set than in the other. From Table 26, we know that the leader's % Own scores were significantly different for 5 out of the 12 functional categories. In Table 27, there is only one instance of these differences being reflected: the greater amount of opposing by participants in Groups 2 & 3. Even here, however, there is evidence that the low amount of opposing by the leader in Groups 1 & 4 was not reflected by both groups. Group 4 did as much opposing as did Groups 2 & 3.

The gap hypothesis makes exactly the opposite prediction. The participants in 2 & 3 in which the leader failed to perform certain functions should show a relatively higher incidence of these contributions than do the participants in Groups 1 & 4. There is no evidence of this in Table 27.

Much the same sort of evidence is presented in Table 28. Two of the differences in the percentage of the total contributions by participants classified in a single category are significantly different: the greater incidence of solution-proposing by participants in Groups 2 & 3 and the greater opposing by participants in Groups 2 & 3. The solution-proposing difference is an instance of gap filling; the opposing

difference is an instance of reflecting leader behavior. There is, then, little evidence in these data of either reflecting leader behavior or filling functional gaps left by the leader. The fact that the total groups showed so few over-all differences, in spite of the difference in leader behavior, is primarily due to greater participation by the participants in Groups 2 & 3. The leadership style differences produced few differences in the pattern of problem-solving behavior of the participants.

There evidently is a considerable range of leader behavior possible before either reflecting or gap filling occurs. It is possible that the length of this tolerance range will vary with the motivation of the participants. Participants who are strongly involved in the conference outcome might permit less deviation from their standards of how a conference should go. Such people might show a considerable tendency to fill gaps. The tolerance range might also vary with the conference experience of participants. The seasoned participant would feel the need for a summary and make one if the leader failed to. The number of persons striving for leadership position would also modify the tendency to fill leader gaps.

The tendency to reflect would presumably be affected by the leader-participant identification pattern. Where identification with leader was strong, the tendency to reflect would be strong. A vertical conference, with a prestigious leader, would increase the tendency to reflect leader behavior.

None of these conditions was present in the experiment being discussed. The participants were well motivated, but they were not personally involved in the conference outcome. They were not experienced conference participants; nor was there opportunity for the development of strong identification with the leader. These considerations suggest that the two popular hypotheses should be reformulated and stated in terms of the kind of problems being discussed, the experience of participants, and strength of leader-member ties. It is possible that the tendency to reflect and the tendency to fill gaps is a crucial distinction and that both occur. As the group meets more and more frequently, the tendency to reflect may yield to the tendency to fill gaps, as dependence on the leader diminishes.

4. The incidence of procedural contributions

As was pointed out earlier, the coders classified the content of each contribution in one of three categories. Category S applied when the contribution concerned the subject matter of the conference - the payment of managers and topics related thereto. Category P was used for contributions which were concerned with the procedure of the group. Most of these contributions described the way the group was proceeding. The third category, M, was used for contributions which had a mixture of procedural and agenda item references.

Because of the small number of purely procedural contributions, the contributions in this category were combined with those classified in the mixed category. The term "procedural contribution" in the following discussion refers, therefore, to those contributions which have a procedural reference, wholly or in part.

Table 29 shows the percentage of contributions in each group which were classified as procedural. There was a significantly greater relative frequency of procedural contributions in Groups 1 & 4 than in Groups 2 & 3. This difference, significant at the 5% level, is due primarily to the difference between Group 1 and the other groups.

The percentage of the total number of contributions which were procedural contributions by the leader and by participants, also shown in Table 29, accounts for the difference between Group 1 and Groups 2, 3 & 4 in total number of procedural contributions. Group 1 differs from Group 4 because both leader and participants make more contributions with procedural references in Group 1 than in Group 4. The over-all difference between Group 1 and Groups 2 & 3 is due primarily to the leader. He makes significantly fewer procedural comments in Groups 2 & 3, than he does in Group 1. There is a tendency for the participants to fill this gap, but it is not great enough to make up the difference.

Table 29 also shows that in Groups 1 & 4 the participants and the leader shared the number of procedural comments about equally. In Groups 2 & 3, however, the participants were most responsible for the procedural comments.

The data in Table 30, showing the percentage of the participants contributions which were procedural, provide another opportunity for determining whether or not the participants reflect the leader's behavior by showing greater incidence of a particular kind of behavior when he shows more of that behavior. The data indicate that three out of the four groups did not reflect the leader behavior. The participants in Group 4 did not reflect the relatively higher incidence of procedural contributions

TABLE 29

PERCENTAGE OF TOTAL CONTRIBUTIONS WHICH
WERE PROCEDURAL CONTRIBUTIONS

	Leader	Participant	Total	Number
A - 1	22	19	41	210
A - 4	15	15	30	185
A - 2	4	25	29	155
A - 3	7	26	33	156
1 & 4	18	17	35	395
2 & 3	6	25	31	311
	**	**	*	

* Difference 1 & 4: 2 & 3 significant at 5% level
 ** Difference 1 & 4: 2 & 3 significant at 1% level

TABLE 30

PERCENTAGE OF PARTICIPANT'S CONTRIBUTIONS
WHICH WERE PROCEDURAL

	<u>N & P</u>
A - 1	28**
A - 4	19**
A - 2	27
A - 3	29
1 & 4	23
2 & 3	28
	**

** Difference between Group 1 and Group 4,
significant at 1% level

by the leader in that conference. The participants in neither Group 2 nor Group 3 reflected the relatively lower incidence of procedural contributions by the leader; they tended to fill the gap left by the leader.

It was pointed out earlier that each functional category might be used with respect to procedural and substantive content. There might for example be procedural as well as substantive solution proposals. It is possible, however, that contributions performing certain functions will rarely have procedural references while others might have a great many. The present data were analyzed to determine whether or not this was the case.

Table 31 shows the percentage of contributions in each category which had procedural references. Since the over-all ratio of substantive to procedural for all conference groups taken together is about 2 to 1, one would expect approximately 33% of the contributions in each category to have procedural references. The actual distribution differs from this chance value for six out of the twelve categories at the 1% level, for two of the remaining six at the 5% level. It is apparent that contributions containing procedural references are more likely to serve certain functions than others. Participants referred to procedure more frequently than not when asking for information, when seeking clarification and elaboration. A significantly greater than the expected number of supporting contributions contained procedural references. This is accounted for by the fact that the individual made explicit that he was supporting a particular individual or position. The same is true for summarizing-seeking and summarizing-giving contributions, as might be expected.

TABLE 31

PERCENTAGE OF CONTRIBUTIONS IN EACH CATEGORY WHICH CONTAINED PROCEDURAL REFERENCES

%	Goal Setting		Prep. Propos.		Inf. Giving		Inf. Solu. Devel.		Devel. Seek.		Giving Oppos. Support.		Summ. Seek.		Summ. Man-Preb. Giving Directed I.	
	20	8*	51**	42	32	64**	15**	32	44**	89**	91**	67*				
Total:	51	33	71	112	216	241	709	381	254	9	45	9	2131			
No. in Category																

* Significantly different from chance expectancy at the 5% level
 ** Significantly different from chance expectancy at the 1% level

Contributions which presented problems and those which elaborated on other contributions more frequently contained no procedural references.

This analysis of contributions in terms of their subject matter indicates that the two sets of groups differed only slightly in the incidence of procedural comments. The difference that does exist was due both to leader and participant behavior. There is evidence that a leader may describe and refer to the manner in which the group is proceeding without increasing the tendency to do so on the part of the participants. However, conspicuous failure to refer to group procedure, does increase the incidence of such comments by the participants. Finally, it is apparent that certain functional contributions have almost exclusively procedural references - summarizing-seeking and giving, development-seeking - while others, such as problem-proposals, development-giving and goal-setting, contain largely substantive references.

5. The sequence of problem-solving functions

The data provided from categorizing contributions into problem-solving functions permit a translation into a system much like that of Dewey(5). Dewey's system implies that at certain stages, certain functions, in terms of this experiment, must be performed. It prescribes an optimal sequence of these functions. The typescript was analysed to determine whether there was any sequence patterning of the functional units and to what extent the sequence patterning was similar to that prescribed by logical analysis of the Dewey type.

Accordingly, three members of the conference staff independently arrived at what they considered optimal sequences of the functional

categories. There was much agreement among the three. After a minimum of negotiation, the following major sequence was arrived at:

Goal-Setting
 Problem-Proposals
 Information-Seeking, Information-Giving
 (one or both, in either order)
 Solution Proposal
 Development-Seeking, Development-Giving
 (one or both, in either order)
 Opposing, Supporting
 (one or both, in either order)
 Summarizing Seeking, Summarizing Giving
 (one or both)

It was recognized that there were minor sequences which might, in an optimal situation, repeat themselves many times; that is, within the major sequence a minor sequence might recur. Accordingly, the following sequences were established:

Minor Sequence A

Solution Proposal
 Development-Seeking, Development-Giving
 Opposing, Supporting

Minor Sequence B

Solution Proposal
 Development-Seeking, Development-Giving
 Opposing, Supporting
 Summarizing Seeking, Summarizing Giving

Examination of the typescripts indicated that no major sequences were present in any of the four typescripts. The only type of minor sequence of contributions present was Type A, where a solution proposal is followed by a development-seeking and/or giving contribution and this by an opposing and/or supporting contribution. The four conference groups are compared with respect to the incidence of this type of sequence in Table 32. In both sets of groups, less than 5% of the actual sequences of three contributions (total number of contributions minus two) were

TABLE 32
THE INCIDENCE OF OPTIMAL SEQUENCES
(MINOR A TYPE)

	Number Sequences of 3	Number of Sequences	Per cent
A - 1	509	16	3.1
A - 4	614	16	2.6
A - 2	528	12	2.3
A - 3	472	10	2.1
1 & 4	1123	32	2.8**
2 & 3	1000	22	2.2**

** Difference 1 & 4: 2 & 3 significant at 1% level

optimal. The difference between the two sets of groups is statistically significant in favor of Groups 1 & 4, but is not of great moment from the standpoint of the efficiency of the problem-solving process.

The next attempt to measure quality of the problem-solving process was made in terms of optimal pairs of contributions. This is less rigorous than the sequence measure of quality. The measure is meaningful, however, if one thinks in terms of a vacuum created by a contribution. Conference groups can be compared as to the extent to which the vacuum created by a given response is optimally filled by the succeeding response. The following list of optimal pairs, derived from the optimal sequence listing described above is illustrative:

Goal-Setting
Problem Proposal

Problem Proposal
Information-Seeking, Information-Giving

Information-Seeking
Information-Giving

Information-Seeking, Information-Giving
Solution Proposal

Solution Proposal
Development-Seeking, Development-Giving

Table 33 shows percentage of optimum pairs for each of the groups separately and for Groups 1 & 4 and 2 & 3 combined. The incidence of optimal pair sequence in all four groups exceeds chance expectancy. With twelve categories there are $\frac{n(n-1)}{2}$ or 66 possible pair sequences. Of these, only twelve are optimal pairings; thus, in a series of 100 pairs, the chance score would be $\frac{12}{66}$ or .19. Of the number of actual pairs, almost one-third were optimal in terms of theory for Groups 1 & 4; in Groups 2 & 3, about one-fourth were optimal. The difference between sets

TABLE 33
PERCENTAGE OF OPTIMAL PAIRS
OF PROBLEM-SOLVING CONTRIBUTIONS

	Number Pairs	Number Optimum	Per cent Optimum
A - 1	510	141	35
A - 4	615	174	28
A - 2	529	140	26
A - 3	473	124	26
1 & 4	1025	315	31**
2 & 3	1002	264	26**

** Difference between Groups 1 & 4 and Groups 2 & 3 significant at the 1% level.

is significant at the 1% level, and is due largely to a better performance by conference Group 1.

6. The incidence of problem-solving functions over periods of time

The analysis of problem-solving in terms of sequences of contributions indicated that optimal orderings were, by and large, very infrequent. Since theoretical formulations such as Dewey's imply some such ordering, their absence might be interpreted as indicating that the formulation is inadequate. The sequence analysis may be too rigorous a test, however. It requires stages within a small unit of time. The Dewey-type of formulation might be interpreted as hypothesizing larger, more global stages. We might then expect a differentiation of function from one period of the conference to the next. For example, in the "felt difficulty" stage, there would be a relatively high proportion of problem-proposals and information-giving and seeking contributions; in the "suggestion of possible solutions" stage, there would be a relatively larger proportion of solution-proposal contributions. The data were examined to see whether there were certain functions which occurred more frequently in certain periods than in others. The percentage of the total contributions in each 15-minutes which fell in each category was computed. This breakdown of the total conference time indicated that functionally each period is much like every other period. This finding is of particular significance when we consider such categories as problem-proposing, solution-proposing, and information-seeking and giving. These are the functions which such formulations as Dewey's would lead one to expect to occur with relatively greater frequency in certain periods than in others.

Although a functional category may account for approximately the same percentage of the total contributions within a 15-minute period from one period to the next, it may be that the percentage of contributions within a category which occur from period to period may fluctuate. That is, while goal-setting contributions account for 5% of the total number of contributions in each 15-minute period, there may be differences in the percentage of the total number of goal-setting statements which occur from one period to the next. This possibility exists because the total number of contributions varies for the 15-minute periods. Accordingly, the percentage of the total number of contributions in each category occurring in each 15-minute period were computed. The same general results were obtained.

In summary, the analysis of problem-solving functions by time intervals indicates that the general pattern of functions performed is very much similar from one period to the next. The proportion of the total number of contributions in each 15-minutes which are classified in a particular category is relatively constant from period to period. The percentage of total contributions within a category which occur in each 15-minute period is also relatively constant. This same result obtained when intervals shorter and longer than 15-minutes were examined. The difference in leadership style in the two sets of groups did not produce significant differences in the temporal pattern of problem-solving functioning. This suggests that the differences in leader behavior and in participant behavior were consistent differences, present throughout the conference period, and were not due to large differences within a particular period.

7. Patterns of individual problem-solving behavior

If a person does most of the goal-setting for the group, is he also likely to do most of the solution-proposing? Are the relationships between functions such that high performance of one predicts high performance of another? While it may be that the pattern which emerges in this study might not be present in another, intercorrelation of problem-solving scores are believed to provide important descriptive measures of the problem-solving process. This is especially true when the design permits comparison of groups. It may be, for example, that groups in which the participants who do most of the solution-proposing and most of the opposing are more productive than ones in which the solution proposing and opposing are done by different persons. To determine whether or not there were individual patterns of problem-solving, the correlations among the two types of problem-solving scores were computed.

Table 34 shows the correlations among the nine % Category scores in which there were a sufficient number of contributions to warrant computation of individual scores.

In the section concerned with the relationship of problem-solving scores to extent of participation (see Participation Behavior), a high correlation is found between the extent to which the individual participated and all but two of the % Category scores. In other words, the high participators tended to account for most of the behavior within each category. This finding is important for interpreting Table 34. A majority of the correlations are significantly positive. The persons who were largely responsible for performance of one function tended to be more responsible than their colleagues for other functions. This is due in part

TABLE 34

INTERCORRELATION AMONG PROBLEM-SOLVING SCORES (% CATEGORY)

	Goal Setting	Inf. Seek.	Inf. Giving	Solu. Prop.	Devel. Seek.	Devel. Giving	Oppos.	Supp.	Summ. Giving
Goal Setting	1 & 4 2 & 3 1 - 4	.31 -.14 .10	.79** .16 .45**	.51* .70** .61**	.61** -.03 .28	.84** .52* .67**	.56* .37 .46**	.19 .59** .39	.56* .62* .62**
Information Seeking	1 & 4 2 & 3 1 - 4		.43 -.19 .15	.41 -.13 .15	.48* .48* .37*	.28 -.14 .09	.52* .12 .29	.20 -.06 .06	.59** -.13 .16
Information Giving	1 & 4 2 & 3 1 - 4			.31 .26 .28	.66** .17 .39	.72** .53* .62**	.42 .34 .38*	.37 .56** .45**	.42 .15 .23
Solution Proposing	1 & 4 2 & 3 1 - 4				.46* .09 .25	.59** .73** .66**	.71** .27 .49**	-.03 .67**	.57* .69** .61**
Development Seeking	1 & 4 2 & 3 1 - 4					.64** .34 .47**	.59** .34 .44**	.65** .19 .43**	.49* -.22 .06
Development Giving	1 & 4 2 & 3 1 - 4					.71** .65** .68**	.71** .65** .68**	.43 .68** .64**	.58 .80 .81
Opposing	1 & 4 2 & 3 1 - 4							.22 .75** .44**	.56* -.09 .13
Supporting	1 & 4 2 & 3 1 - 4								.01 .24 .16

* Significant at the 5% level

** Significant at the 1% level

to the relationship of the % Category score to extent of participation.

There is an important exception to this general finding. It is clear from the table that for certain pairs of variables the relationship is quite different in the two sets of situations. This is most clearly the case with respect to supporting which is significantly related to all other functional scores in Groups 2 & 3 except development-seeking and information-seeking. In Groups 1 & 4, however, supporting is significantly related to only one other functional score, development-seeking. In other words, the supporting in Groups 2 & 3 was done by the same persons who performed most of the other functions. This was not true in Groups 1 & 4. One other difference between the two sets of groups is apparent. Development-seeking and information-seeking in Groups 1 & 4 were a part of the functional behavior of those who were primarily responsible for the behavior in other categories. In Groups 2 & 3, however, these two functions are significantly correlated with each other but neither are significantly correlated with other functional scores. The same persons in Groups 1 & 4, were responsible for most of the behavior in all categories except supporting. In Groups 2 & 3, there were two sets of responsible persons: those who did most of the development-seeking and information-seeking and those who perform most of all the other functions, including supporting.

The discussion of intercorrelations of the % Category scores describe the manner in which functional contributions were related for the group as a whole. Another question is whether the functions an individual performs pattern themselves in any way. That is, if a person sets goals, does he also summarize; or is goal-setting behavior related to solution-proposing? In contrast to the % Category scores, the interrelations of

the % Own scores shown in Table 35 are relatively independent of the extent to which an individual participates. They are related to participations only insofar as participation affects the number of category scores available for a participant.

Most of the behavioral scores are not significantly related to each other. There are, however, a few functional scores which are significantly correlated in the four groups. The more solution-proposing the individual does, the less supporting and development-seeking he does. These interrelations suggest that the individual oriented toward contributing solution proposals is less likely to make contributions which are essentially reacting to what others have said, such as supporting and seeking elaboration.

There is one instance of a significantly different correlation between two scores in the two sets of groups. In Groups 1 & 4 there is a slight positive correlation between the extent of solution-proposing and extent of opposing; in Groups 2 & 3 the relationship between these scores is significantly negative. There are several other instances where coefficients, while not significantly different in the two sets of groups, are sufficiently dissimilar to indicate that the manner in which the individuals patterned their contributions was quite different in the two sets of groups.

The interpretation that initiating behavior, such as solution-proposing, and information-seeking, is negatively related to reacting behavior - such as supporting and development-seeking, is more correct for Groups 2 & 3 than for Groups 1 & 4. The correlation between development-giving and opposing suggests that in Groups 1 & 4, the participants

TABLE 35

INTERCORRELATIONS AMONG PROBLEM-SOLVING SCORES (% OWN)

	Goal Setting	Inf. Seek.	Inf. Giving	Solu. Prop.	Devel. Seek.	Devel. Giving	Oppos.	Supp.	Summ. Giving
Goal Setting									
1 & 4		-.28	.15	-.38	-.26	.28	-.29	.22	.18
2 & 3		-.18	-.08	-.30	+.11	-.26	.36	.22	.16
1 - 4		-.16	.02	-.30	-.06	-.08	.06	.16	.18
Information Seeking									
1 & 4			.09	.12	-.02	-.23	.10	-.27	-.02
2 & 3			-.11	+.63**	.05	-.67**	-.41	-.41	-.16
1 - 4			-.07	.54**	.03	-.57**	-.22	-.30	-.09
Information Giving									
1 & 4				-.30	.14	.17	-.41	-.12	.03
2 & 3				-.41	.15	-.19	.10	-.03	.14
1 - 4				-.36*	.14	-.07	-.11	-.09	.10
Solution Proposing									
1 & 4					-.42	-.15	.24	-.54*	.12
2 & 3					-.43	-.08	-.71**	-.40	.09
1 - 4					-.42**	-.13	-.45**	-.45**	.12
Development Seeking									
1 & 4						-.21	-.20	.27	-.19
2 & 3						-.36	.29	-.19	-.26
1 - 4						.29	.04	.09	-.22
Development Giving									
1 & 4						-.63**	-.06	-.06	-.02
2 & 3						-.23	.09	.01	.01
1 - 4						-.41*	.06	-.02	-.02
Opposing									
1 & 4							-.36		-.23
2 & 3							.18		-.23
1 - 4							-.20		-.21
Supporting									
1 & 4									-.06
2 & 3									.36
1 - 4									.07

* Significant at the 5% level
 ** Significant at the 1% level

reacted to what was said either by elaborating or by opposing. If one tended to develop other contributions, one did not oppose and vice versa. In Groups 2 & 3, the participants who opposed contributions were as likely to elaborate as those who did no opposing.

In summary, the intercorrelations among problem-solving scores which use the functioning of the group as a whole as the base (% Category) indicate that in both sets of groups, persons who are primarily responsible for one type of behavior tend to be responsible for all other behaviors as well. Since these scores are highly related to extent of participation, this finding has been interpreted to mean that in both sets of groups, the high participators were responsible for most of the behavior in each category. There were, however, differences between the sets of groups, in the patterning of interrelations, with the high participators in Groups 2 & 3 doing relatively less of the opposing, of the information and development-seeking, and relatively more of the supporting than the high participators in Groups 1 & 4.

From the standpoint of the individual himself and the manner in which he distributed his contributions over the problem-solving categories, there is, in general, little relationship among the functions. There were, however, some indications that initiating types of behavior such as information-seeking and solution-proposing tended to be correlated positively. There was also a tendency for these initiating types of behavior to be negatively related to reacting functions such as development-seeking and supporting. This tendency was less marked in Groups 1 & 4 than in Groups 2 & 3. The differences in leadership style produced different patterns of individual problem-solving behavior.

8. Summary of experimental findings

The differences in leadership style produced significant differences in the problem-solving behavior of the groups on four out of the twelve problem-solving behavior scores. The most notable difference was the greater amount of opposing in the groups under the negative leadership style. Of the four instances of differences in total group performance, two were due primarily to differences in leader behavior and two were due primarily to differences in participant behavior in the two sets of groups. There is little evidence that the participants in the two sets of groups reflected the leaders' behavior or that they filled function gaps left by the leader by a change in their patterns of behavior. The behavior of the participants was remarkably similar in the two sets of situations, despite marked differences in leader behavior.

The sets of groups differed significantly in the incidence of contributions containing references to group procedure. This difference, also, is primarily due to differences in the behavior of the leader himself. There is some evidence that the participants in the negative leader situations tended to fill the gap left by the leader's infrequent references to group procedure.

The positive leadership style produced slight evidences of higher quality problem-solving behavior in terms of a higher incidence of theoretically optimum sequences and optimum pairs. By and large, however, the incidence of optimum sequences and pairs was very low for all groups.

There is considerable evidence that in terms of the functions that are performed, each conference period, in this case 15-minute periods,

is very much like every other period. There was little evidence that certain functions were performed early in the conference period and others late.

D. The Relationship of Problem-Solving Scores to Conference Outcomes

1. The relationship between problem-solving scores and measures of participant satisfaction

This section deals with the general problem of whether or not the problem-solving behavior of a group member is related to the feelings of satisfaction with which he emerges from the meeting. Table 36 shows the correlations between the two types of problem-solving scores and the three satisfaction measures. Whenever the correlation coefficients are significantly different in the two sets of groups, no coefficient is reported for the four groups combined.

Satisfaction with group process.- Do the persons who are satisfied with group process perform different functions, or perform the same functions to a different extent than those who are less satisfied? The data in Table 36 show that none of the % Own scores are significantly related to the participant's satisfaction with process. In both sets there is a slight tendency for higher relative incidence of goal-setting to go with higher satisfaction. There is evidence of the differential significance of opposing in the two sets of groups, which is mentioned in other connections. (See The Relationship among Interpersonal and Problem-Solving Variables) Relatively high incidence of opposing is associated with less satisfaction in Groups 1 & 4 and relatively greater satisfaction in Groups 2 & 3. The same tendencies toward significant correlations and the same differential relationships are apparent with the % Category score.

TABLE 36

CORRELATIONS BETWEEN SATISFACTION MEASURES AND PROBLEM-SOLVING SCORES

	Satisfaction with Group Process (QIV, 5 & QIII, 5)		% Own Satisfaction with Leader Performance (QIV, 6)		Satisfaction with Decision (QIII, 1, 6, 8)		Satisfaction with Group Process (QIV, 5 & QIII, 5)		% Category Scores Satisfaction with Leader Performance (QIV, 6)		Satisfaction with Decision (QIII, 1, 6, 8)	
	1 & 4	2 & 3	1 & 4	2 & 3	1 & 4	2 & 3	1 & 4	2 & 3	1 & 4	2 & 3	1 & 4	2 & 3
Goal Setting	.24	.20	.20	.20	-.11	-.35	-.27	-.13	.21	.15	-.31	.43
Information Seeking	1 & 4	-.01	-.04	-.11	-.06	-.03	-.03	.06	.21	.02	-.05	.07
	2 & 3	.20	-.16	-.02	.17	.02	.02	.52	.28	-.46	.31	-.05
	1 & 4	.15	-.22	-.03	-.05	.21	-.03	.21	-.15	-.27	.07	-.21
Information Giving	1 & 4	.56	.13	.01	.05	.17	.05	.31	.25	.28	-.05	-.11
	2 & 3	.02	-.02	-.01	-.06	-.02	-.05	-.16	.27	.27	-.21	-.05
	1 & 4	.18	-.01	-.01	.05	.02	.05	.02	.25	.27	-.11	-.05
Solution Proposing	1 & 4	-.16	-.37	-.09	-.09	.06	-.09	.06	-.19	-.19	-.26	.23
	2 & 3	-.06	.25	-.16	-.16	-.20	-.16	-.20	.23	.23	-.02	-.02
	1 & 4	-.09	-.03	-.03	-.13	-.11	-.13	-.11	.06	.06	.10	-.05
Development Seeking	1 & 4	.09	.36	.36	.28	.27	.28	.27	.36	.36	-.05	.02
	2 & 3	.17	-.49*	-.05	-.05	.26	-.14	.26	-.36	-.36	-.05	-.02
	1 & 4	.14	-.10	-.10	-.09	-.01	-.09	-.01	.21	.21	-.53	.12
Development Giving	1 & 4	-.14	.41	.31	-.24	-.15	-.15	-.15	.22	.22	.12	-.12
	2 & 3	-.44	.11	-.33	-.41	.27	.27	.16	.22	.22	-.45	.15
	1 & 4	-.33	-.20	-.20	-.15	.04	.04	.04	.06	.06	-.20	-.20
Opposing	1 & 4	-.35	.11	.11	-.39	.35	.35	.35	.25	.25	.21	.21
	2 & 3	.30	-.33	-.33	-.24	.33	.33	.24	.26	.26	.12	.12
	1 & 4	.04	-.20	-.20	-.15	.09	.09	.09	.20	.20	-.12	-.12
Supporting	1 & 4	.18	-.06	-.06	.39	.39	.39	.24	.22	.22	-.45	.15
	2 & 3	-.002	.22	.22	.33	.33	.33	.24	.22	.22	-.15	-.15
	1 & 4	.09	.24	.24	.36*	.36*	.36*	.04	.06	.06	-.20	-.20
Summary Giving	1 & 4	.37	-.11	-.11	.35	.35	.35	.16	.16	.16	.08	.08
	2 & 3	-.04	.10	.10	.38	.38	.38	.24	.21	.21	-.08	-.08
	1 & 4	.10	-.05	-.05	.35*	.35*	.35*	-.14	.21	.21	.33	.33

* Significant at the 5% level

The lack of relationship between the proportion of the individual's contributions which perform a given function and his satisfaction with the group's procedure is contrary to expectations. It seems very plausible that a person who was dissatisfied with an aspect of group process, such as the amount of information it had at its disposal, would show a relatively high incidence of information seeking contributions. The failure of such relations to show up might be due to the fact that a general satisfaction with process measure was used. If satisfaction with specific aspects of process were ascertained, one might be able to predict satisfaction with these aspects from the behavior of the participants. The design permitted a tentative test of this ad hoc hypothesis. The participants indicate their satisfaction with the amount of information that was considered in arriving at the decision, Questionnaire III, Item 5. Scores on this item were correlated with amount of information-seeking done by the participant. The correlation was not significantly different from zero. This negative finding suggests another factor to be taken into account. We need expect our information-seeking participants to be dissatisfied only if the information they sought was not forthcoming. In other words, it is unlikely that incidence in a particular category will be predictive of satisfaction. It is probably necessary to hypothesize a relationship between a pattern of problem-solving behaviors and satisfaction with process.

Satisfaction with leader performance.- It is apparent from Table 36 that the participants who were satisfied with the leader performed quite differently in the two situations. The participants who were satisfied did

relatively more development-seeking in Groups 1 & 4 and significantly less in Groups 2 & 3. A differential relationship also exists with respect to solution-proposing, although the coefficients obtained in the two sets of groups are not significantly different. It is apparent that the kind of behavior which is associated with satisfaction for the leader depends on the total situation. These same findings appear when the % Category scores are used.

Satisfaction with decision.- In general, the participant's satisfaction with the decision arrived at by the groups is relatively independent of the proportion of his contribution which fall in a particular category. In both sets of groups, however, the persons who did relatively more supporting were more satisfied with the decision reached than those who did relatively less. In addition to its theoretical importance, this finding has methodological significance. In a sense, the relative incidence of supporting comments is a continuing evidence of satisfaction with what is being said. The decision is a synthesis of what has been said. Interpreted in this fashion, the satisfaction with decision measure is in a sense partially validated by this significant correlation. Validating evidence of the same sort comes from the finding that, in both sets of groups, the greater the relative incidence of summarizing the greater the satisfaction with decision. This relationship is probably a result of the fact that the various aspects of the decision were stated in summarizing contributions. The person who summarizes does so when he agrees; thus the persons who do relatively much summarizing, are doing considerable accepting.

The participant's satisfaction with decision appears to be unrelated to the extent to which he was responsible for any function. There is one instance in which the functional specialists differed significantly in their feelings about the decision in the two sets of groups. The goal setters in Groups 1 & 4 were dissatisfied; the goal setters in Groups 2 & 3 were satisfied.

As is pointed out in connection with the relationship between interpersonal variables and problem-solving scores, opposing contributions had a different meaning in the two sets of groups; the coefficients are significantly different in the two situations. In Groups 1 & 4, the relative incidence of opposing contributions is negatively related to decision satisfaction; in Groups 2 & 3 the relationship is positive. This differential relationship of opposing to decision satisfaction is also found with the % Category scores, although the coefficients are not significantly different in the two sets of groups.

The general tendency, summarizing all instances of differential relationships, is for extent of opposing to be negatively associated with satisfaction with decision and group procedure and positively related to satisfaction with the leader in Groups 1 & 4; in Groups 2 & 3, the relationship tends to be positive for satisfaction with the groups decision and procedure and negative for satisfaction with the leader. These relationships hold for both types of problem-solving scores. This suggests that the opposers in Groups 1 & 4 were identified with the leader and were attacking fellow participants; the opposers in Groups 2 & 3 were satisfied with the group -- its decision and its procedure, but attacked the leader. This hypothesis is confirmed partially by the finding that in

Groups 1 & 4 only 3% of the opposing contributions were directed at the leader while in Groups 2 & 3, 14% were directed at the leader. Conversely, 28% of the supporting contributions were leader supporting in Groups 1 & 4 while in Groups 2 & 3 only 13% were supporting the leader.

These results permit three conclusions: by and large, the amount of variance in the satisfaction outcomes accounted for by the problem-solving scores of participants is very slight. Second, a participant's problem-solving score in a particular category may, however, be significantly related to his satisfaction with conference outcome. In this experiment a high proportion of supporting and summarizing was positively related to decision satisfaction, in both situations. Finally, the direction of the relationship between satisfaction outcomes and certain behavior scores depends on the total situation in which the behavior takes place.

2. The relationship of problem-solving scores to decision quality

This section is concerned with whether or not the individual's solution is affected by the problem-solving functions he performs.

The correlations between both kinds of problem-solving scores and the measure of decision quality are shown in Table 37.

Extent of agreement with the criterion quality score, i.e., with the solution derived by experts, is significantly related to only one of the problem-solving scores and this relationship holds in only one set of groups. The persons with higher percentages of their own contributions in the goal-setting category in Groups 2 & 3 showed the greatest agreement with the criterion score. The coefficient is significantly different in

TABLE 37

THE RELATIONSHIP BETWEEN PROBLEM-SOLVING SCORES
AND THE MEASURE OF DECISION QUALITY

		% Own Score		% Category Score	
		Criterion Quality Score	Criterion Quality Score	Criterion Quality Score	Criterion Quality Score
Goal Setting	1 & 4		-.16		-.09
	2 & 3		.52*		.38
	1 - 4				.15
Information Seeking	1 & 4		.19		-.13
	2 & 3		-.19		-.01
	1 - 4		-.11		-.06
Information Giving	1 & 4		-.04		-.06
	2 & 3		.05		-.24
	1 - 4		.02		-.17
Solution Proposing	1 & 4		.04		-.05
	2 & 3		-.06		.17
	1 - 4		-.04		.07
Development Seeking	1 & 4		-.29		-.26
	2 & 3		.10		-.14
	1 - 4		-.06		-.19
Development Giving	1 & 4		.25		-.01
	2 & 3		-.06		-.15
	1 - 4		.05		-.06
Opposing	1 & 4		.07		.06
	2 & 3		.04		-.27
	1 - 4		.05		-.11
Supporting	1 & 4		-.28		-.22
	2 & 3		.12		-.17
	1 - 4		-.09		-.19
Summary Giving	1 & 4		-.03		-.12
	2 & 3		.33		.30
	1 - 4		.17		.15

* Significant at the 5% level

Groups 1 & 4, where the relationship of goal-setting to quality is slightly negative. These same general lack of relationship also holds for the % Category scores, as does the differential relationship of goal-setting to quality.

There are two general conclusions warranted by these data. The first is that by and large the quality of the participant's solution is unrelated to the proportion of his contributions which fall in certain problem-solving categories or to the extent to which he was responsible for behavior in a category. The second conclusion is that the manner in which a problem-solving score is related to the quality of individual solutions may depend on the total situation. This is suggested by the finding that the proportion of goal-setting statements is positively related to quality, as measured by the external criterion in Groups 2 & 3 and significantly different in the negative direction in Groups 1 & 4.

The general lack of relationship between the quality of individual solutions and the individual problem-solving scores does not warrant the conclusion that there is no relationship between the problem-solving process and decision quality. It may be that the group problem-solving scores, or certain pattern scores derived from them, are related to quality of the individual as well as group decision. The individual's solution as well as the group's solution is a function of what is done by the group as a whole. The present findings indicate that the quality of the individual's own solution is very little affected by the functions he himself performs. With only four groups and no significant differences among them as to decision quality it is not possible to test the hypothesis that decision quality is related to group problem-solving scores.

III. Communication Variables

The theoretical framework for this experiment posited that conference outcomes were affected by the degree of understanding by participants of what was said during the conference. The leadership styles prescribed for the two sets of groups differed markedly with respect to this variable. Examination of the typescript and the wire recording revealed that the leader did alter his behavior in the manner prescribed. In Groups 1 & 4 the leader made significantly more attempts to get clarification than he did in Groups 2 & 3.

The amount of difficulty the participant had in understanding what was being said was measured by two questionnaire items (Questionnaire III, Items 11 and 12), and by an index derived from the typescript: the number of times the participant requested clarification. In spite of the differences in leader behavior, the two sets of groups did not differ significantly on any of these measures. Two graduate students in speech, with teaching and contest-judging experience, rated the participants' voice quality and clarity of articulation. Each participant's speaking rate was also determined. The participants of all groups were within the normal range on these variables.

The communication scores showed virtually no significant relationships to the interpersonal variables nor to the problem-solving scores. They were also unrelated to the quality of the individual's solution and to his satisfaction with group process, leader performance or group decision. This general absence of significant relationships is probably due to the narrow range on the difficulty of understanding measures and to the fact that the speaking characteristics of the participants were well within the normal range.

IV. The Relationship among Interpersonal and Problem-Solving Variables

The theoretical framework in which this experiment was conducted hypothesizes that there will be lateral effects of the process variables. That is, the problem-solving behavior will affect the interpersonal relations that exist among participants. For the most part, this theoretical area has been undeveloped; the probability of lateral effects has been stated but the exact hypothesized relations have not been defined for all variables. The hypotheses which have been developed will be discussed in connection with variables concerned.

This section is concerned with the relation between the person's problem-solving behavior and his perception of the group, his feeling of being accepted, his acceptability to his fellow participants as a person and as participant and his liking for the leader.

These five interpersonal variables were correlated with the two types of problem-solving function scores: the percentage of the participant's contributions which served a particular function (% Own) and the percentage of the contributions in each functional category which were accounted for by the individual (% Category). The variables were correlated separately for the two sets of groups as well as for all groups combined. No coefficient is reported for all four groups when the correlation coefficients are significantly different in the two sets of groups.

A. The Relationship of Interpersonal Variables to % Own Problem-Solving Scores

Table 38 shows the correlations between the interpersonal measures

TABLE 38

CORRELATIONS BETWEEN INTERPERSONAL VARIABLES AND PER CENT
OF OWN CONTRIBUTIONS IN A
PROBLEM-SOLVING CATEGORY (% OWN)

		Perception of Unity (QIII, 13) (QIV, 1)	Feeling Accepted as a Member (QIV, 8)	Accepta- bility as Participant to Others (QIII, 9) (QIV, 9)	Accepta- bility as Person to Others (QIII, 10)	Personal Liking for Leader (QIV, 7)
Goal	1 & 4	-.37	-.38	-.04	-.39	.11
Setting	2 & 3	.16	.00	.11	-.08	.12
	1 - 4	-.10	-.17	.05	-.22	.08
Information	1 & 4	-.12	.00	.35	.40	-.26
Seeking	2 & 3	.07	-.39	-.33	-.05	-.27
	1 - 4	.00	-.30		.03	-.30
Information	1 & 4	-.18	.19	.15	-.58*	-.02
Giving	2 & 3	-.08	.46*	.13	.01	.16
	1 - 4	-.13	.36	.14	-.22	.07
Solution	1 & 4	.09	-.31	-.05	.40	-.27
Proposing	2 & 3	.09	-.35	-.51*	-.12	.08
	1 - 4	.08	-.34*	-.30	.08	-.10
Development	1 & 4	.31	.47*	.22	-.01	.20
Seeking	2 & 3	-.08	-.08	-.01	.08	-.15
	1 - 4	.12	.16	.11	.04	.01
Development	1 & 4	.07	-.11	-.15	-.41	.44
Giving	2 & 3	-.18	.12	.16	.15	.27
	1 - 4	-.05	.05	.02	-.08	.37*
Opposing	1 & 4	-.27	-.02	-.36	.18	-.59
	2 & 3	.02	.10	.29	-.09	-.25
	1 - 4	-.15	.03	-.04	.05	-.42**
Supporting	1 & 4	.09	.22	.26	.28	.38
	2 & 3	.21	.40	.36	.09	.11
	1 - 4	.17	.28	.25	.18	.34*
Summarizing	1 & 4	-.07	-.25	.24	.12	.07
Giving	2 & 3	.12	.28	-.09	-.14	.12
	1 - 4	.01	.04	.08	-.02	.05

* Significant at the 5% level

** Significant at the 1% level

and the % Own problem-solving scores. The individual's perception of the unity of the group is apparently unrelated to the relative extent to which he performs a particular function. There are a number of indications that the relationship between perception of unity and the extent to which the individual performs certain functions is different in the two sets of groups, although none of the differences is statistically significant. Both amount of goal setting and development seeking are related differently to perception of unity in the two sets of groups. The difference between the two sets in the way supporting and opposing behavior are related to perception of unity, while not significant, is one which is corroborated in a number of places in the total analysis. The functions of opposing and supporting seems to have had different meaning in the two situations. In Groups 1 & 4 the relative amount of supporting done has no relation to perception of unity while opposing tends to be negatively related. In Groups 2 & 3, on the other hand, the relative amount of opposing is not related to perception of unity, while the amount of supporting tends to be positively related to the perception score. The significance of opposing and supporting behavior depends evidently, on whether or not there is a general atmosphere of supporting, as in Groups 1 & 4, or opposing, as in Groups 2 & 3.

The participant's feeling of being accepted is also unrelated to most of the problem-solving scores. Only two of the measures are significantly related to feeling accepted, for all four groups combined. The more solution-proposing the participant did, the less accepted he felt. The more of the participant's contributions which were

information-giving, the more accepted he felt he was. The significant relationship for all four groups is due primarily to the relatively higher relationship in Groups 2 & 3. There are other evidences of differential relations in the two sets of groups, although none of the differences is significant. The relative amount of goal-setting, information-seeking, development-seeking, and summarizing are related differently to feeling accepted in Groups 1 & 4 than they are in Groups 2 & 3. These differential relationships indicate that certain functions were perceived by those who performed them as receiving a different kind of reception in the two sets of groups. There is the possibility, however, that people who felt accepted in one set of groups tended to perform certain functions relatively more frequently than others, while in the other set there was no such tendency. Actually, there is no way to determine the direction of the effect in this experiment. It is suggestive that the behaviors which are negatively related to feeling accepted in Groups 1 & 4 and positively related to feeling accepted in Groups 2 & 3 are commonly accepted as leader functions: summarizing and goal setting.

The extent to which the individual was accepted as a participant is not significantly related to any problem-solving score, for all groups combined. Only one of the functional scores is significantly related in a set of groups. The more solution-proposing the individual did the less acceptable he was to his colleagues in Groups 2 & 3. There is a tendency for the persons who did more supporting to be more highly regarded in both sets of groups, although the relationship is not significant. There is one instance of a statistically significant difference in the relationship between being accepted as a participant and problem-solving scores.

The more information-seeking the individual did the more accepted he was in Groups 1 & 4, the less accepted he was in Groups 2 & 3. There is a nearly significant difference between sets in the relation between opposing and being accepted; the more opposing the participant did the less accepted he was in Groups 1 & 4 and the more accepted he was in Groups 2 & 3. This again illustrates the difference in meaning of opposing behavior in the two sets of groups. The leadership style produced differences in the two sets of groups in the behaviors which characterized the most acceptable participants.

The individual's acceptability to his colleagues as a person is significantly related to only one problem-solving score and that relationship holds in only one set of groups. The participants who did relatively more information-giving were less acceptable as persons in Groups 1 & 4; in Groups 2 & 3 there is no relationship between the two scores. While none of the differences between correlation coefficients are significant, there are evidences of differential relationships in the two sets of groups for virtually all problem-solving scores. The more goal-setting, the more information-giving, the more development-giving the participants did, the less acceptable he was as a person in Groups 1 & 4. These scores are not related to being accepted in Groups 2 & 3. These results indicate that the leadership style differences also produced differences in the behaviors which characterized the participants who were acceptable persons to their colleagues.

Participants who liked the leader personally did relatively more development-giving and supporting and relatively less opposing than their colleagues who liked the leader less. These relationships are

statistically significant for all groups combined and are in the same direction in both sets of groups. In every case, however, the relationship is less marked in Groups 2 & 3 than in Groups 1 & 4. The relationship between amount of information-seeking and personal liking for the leader is almost significantly negative, in both sets of groups. Again, there are several instances of differential relations in the two sets of groups, although none of the differences are statistically significant. These findings indicate that attitude toward the leader modifies the problem-solving behavior of the participants and further that the manner in which the behavior is modified depends on the total situation in which the behavior takes place.

B. The Relationship of Interpersonal Variables to % Category Problem-Solving Scores

Table 39 shows the correlations between each of the % Category problem-solving scores and the interpersonal variables. A high % Category score for an individual means he was responsible for a good deal of the behavior in that category.

Perception of the group as unified is not significantly related to any of the problem-solving scores for all four groups combined. The goal setters in the two sets of groups differed significantly in their perceptions of unity. In Groups 1 & 4 there is a negative but not significant relationship between these scores while in Groups 2 & 3 goal-setting is positively related to perception of unity. There are other evidences that persons who were responsible for the same behavior to the same degree in the two situations perceived the group quite differently although the coefficients are not significantly different. The general

TABLE 39

CORRELATIONS BETWEEN INTERPERSONAL VARIABLES AND PER CENT
OF TOTAL CONTRIBUTIONS IN EACH CATEGORY ACCOUNTED
FOR BY EACH PARTICIPANT (% CATEGORY)

		Perception of Unity (QIII, 13) (QIV, 1)	Feeling Accepted as a Member (QIV, 8)	Accepta- bility as Participant to Others (QIII, 9) (QIV, 9)	Accepta- bility as Person to Others (QIII, 10)	Personal Liking for Leader (QIV, 7)
Goal Setting	1 & 4	-.29	.12	-.01	-.52**	.04
	2 & 3	.45*	.52*	.36	.02	.35
	1 - 4		.35*	.18		.20
Information Seeking	1 & 4	-.23	-.03	.29	.01	-.23
	2 & 3	.42	.29	.27	.18	-.34
	1 - 4	.01	.08	.22	.06	-.20
Information Giving	1 & 4	-.16	.13	.21	-.60**	.07
	2 & 3	-.11	.30	.25	.08	.22
	1 - 4	-.12	.20	.22		.15
Solution Proposing	1 & 4	-.22	.08	.01	-.13	-.20
	2 & 3	.23	.39	.42	.08	.03
	1 - 4	.01	.25	.20	.08	-.10
Development Seeking	1 & 4	.13	.54*	.23	-.19	.13
	2 & 3	-.15	.21	.14	.06	-.25
	1 - 4	-.03	.34*	.19	-.05	-.14
Development Giving	1 & 4	-.03	.24	-.11	-.51*	.15
	2 & 3	.01	.36	.63**	.29	-.10
	1 - 4	-.01	.30			.01
Opposing	1 & 4	-.37	.18	-.08	-.27	-.23
	2 & 3	-.06	.29	.56**	-.05	-.30
	1 - 4	-.21	.24		-.16	-.20
Supporting	1 & 4	.45	.47*	.25	.09	.30
	2 & 3	.08	.36	.52*	.17	-.06
	1 - 4	.26	.40*	.37*	.13	.09
Summarizing Giving	1 & 4	-.37	-.05	.38	-.08	.09
	2 & 3	.05	.21	.14	.06	.03
	1 - 4	-.13	.10	.23	.07	-.05

* Significant at the 5% level

** Significant at the 1% level

trend which runs through these differential relations is that, in Groups 1 & 4, individuals most responsible for guiding and directing functions such as goal-setting, information-seeking, solution-proposing, and summarizing, tended to perceive their groups as less unified than their colleagues who were less responsible for these behaviors. The tendency is in the opposite direction in Groups 2 & 3. These differential relationships might be due to the fact that the participants in Groups 1 & 4 who were most responsible for these behaviors were, in effect, competing with the leader, hence projecting upon the group the disunity for which they were responsible. Conversely, in Groups 2 & 3, the participants most responsible for these functions were not competing with the nominal leader; he performed these functions to a very limited extent.

The person's feeling of being accepted is related to several of the % Category scores. The goal setters in Groups 2 & 3 felt more accepted than those less responsible for goal-setting. There is no relationship between these measures in Groups 1 & 4. The relationship is also significantly positive between feeling accepted and amount of the development-seeking done by the participant in Groups 1 & 4. The correlation is also positive but not significant in Groups 2 & 3. The more of the supporting the individual did the more accepted he felt. The solution proposers in Groups 1 & 4 felt no more accepted than those who did less of the solution-proposing; in Groups 2 & 3 there was a tendency for the solution proposers to feel more accepted. In summary, the extent to which the individual feels accepted by his colleagues is related to the extent to which he performs certain problem-solving functions. The results obtained here suggest that when the participant is

responsible for behavior which are leader behaviors but are not being performed by him, the participant tends to feel accepted. When these functions are being performed by the leader, the participants who also perform them tend to feel less accepted. The causal relationship might be the other way, of course; the accepted person might feel free to assume leader functions. This would readily account for the relationships found in Groups 2 & 3. To account for the relationships in Groups 1 & 4, however, it would mean that the person who felt less accepted attempted to vie with the leader in the performance of certain functions. It seems more reasonable, however, to hypothesize that the same behavior resulted in different feelings of acceptance in the two situations than to hypothesize that the same degree feeling of acceptance resulted in different behaviors in the two situations.

The correlations between the % Category scores and the extent to which the individual was accepted as a participant indicate that there were different attitudes toward the person responsible for the same behaviors in the two situations. While the correlations are not significant, the goal setters and solution-proposers in Groups 2 & 3 tended to be more accepted than their colleagues who did less of the goal-setting and solution-proposing. In Groups 1 & 4 there is no relationship between these scores. The persons responsible for the developing and opposing were significantly more accepted in Groups 2 & 3. The relationship is significantly different in Groups 1 & 4 where the developers and opposers were no more accepted than were the other participants. The relationship between the amount of the supporting which was done by the participant and his acceptability is positive in both sets of groups,

but significantly different from zero only in Groups 2 & 3. The behavior which characterized the most accepted persons differed in the two sets of groups.

All of the significant relationships between the extent to which the individual was accepted as a person and his functional specialization scores occur in Groups 1 & 4. In these groups the goal setters, the information givers, and developers were less liked than others less responsible for these functions. The correlations for Groups 2 & 3 are all approximately zero except for development-giving which, while not significant, is in the opposite direction and significantly different from than obtained in Groups 1 & 4. The leadership style differences, then, produced differences in the relationship between personal acceptability and problem-solving scores. In general, the functions which a person performed for the group were unrelated to personal acceptability in Groups 2 & 3; in Groups 1 & 4, the goal setters, information givers, and developers were less liked by their colleagues than those who were less responsible for these functions.

None of the % Category scores are significantly related to personal liking for the leader. There are indications, however, that there was a differential effect of liking the leader personally on problem-solving behavior in the two situations. This is true for the goal-setting, supporting and development seeking scores, although the coefficients are not significantly different. There is then a suggestion in these results that liking for the leader dictated one kind of behavior when the leader is active and helpful and another kind of behavior when the leader is relatively inactive and negative in his behavior.

C. Summary and Conclusions

While many of the correlation coefficients reported fall short of statistical significance, there is ample evidence of lateral effects between problem-solving scores and interpersonal variables. This evidence is provided not only by the instances of significant correlation but also by the frequent indications of a different relationship in the two sets of groups between a given problem-solving score and particular interpersonal variables. Persons who perceive unity, who felt accepted and liked the leader behaved quite differently in the two situations. The behavior which characterized the persons who were highly regarded as participants and as persons differed in the two situations. It seems clear from these data that the significance of a particular kind of problem-solving behavior depends on the total situation. One cannot predict, for example, that a relatively high amount opposing behavior would mean the individual would not be liked personally or regarded as productive. These data indicate that it depends on the group pattern with respect to opposing. Similarly, performing the helpful function of solution-proposing, goal-setting, and summarizing may not insure high productivity ratings for the participant. Whether or not it does, depends on the leader-group relations with respect to these functions.

The general pattern which appears to run through the differential relationships is that responsibility for behaviors which are accepted as leader behaviors tends to make one perceive unity, feel accepted and be accepted both as a person and as a participant when the leader is inactive and non-helpful. When the leader is active and positive, performance of these functions has exactly the opposite effects. These

relationships are most clear when the behavior is viewed from the standpoint of the group, as is the case with the % Category scores. These same tendencies are present but less clear when the behavior is viewed from the standpoint of the individual himself as is the case with the % Own scores.

V. Participation Behavior

Participation is regarded as very important in the common sense writings on conferences and group discussions. There is much emphasis on the value of securing widespread participation in the group. However, the assumptions underlying this emphasis are rarely stated explicitly. Part of the stress comes from the evidence that group products are superior to individual efforts under certain circumstances. (13,16) If the group is superior to the individual then the more people participating, the greater the superiority of the group - so the reasoning goes. Experience in supervisory training programs in industry suggests that training is more effective when the supervisors participate in solving problems facing the group than when the lecture method is used. (7,p.361)

Additional data which tends to justify the emphasis on participation, come from learning experiments. When an individual assumes an active role in learning he tends to learn more rapidly and retain the learned responses longer than when he remains passive in the learning process. Haggard and Rose (9) state this as a "Law of Participation." Baer (2) demonstrated that participation was important in developing voluntary control of infrequently used muscles.

There is also emphasis on the importance of participation in clinical work. Snyder (14,p.2) describes non-directive counseling as "client centered", indicating the active participation of the client in the direction of the therapy process, a factor which he regards as critical in therapy.

This brief summary indicates that there is theoretical and

experimental support for the notion that aspects of the participation pattern during a conference are related to both the quality of decision outcome and participant changes as a result of the conference; i.e., to both types of conference outcomes in which we are interested.

This section presents the participation patterns of the groups, the relationship of extent of participation to problem-solving and interpersonal scores and finally, the relationship of extent of participation to measures of conference outcomes.

A. Participation Characteristics of the Groups

1. Participation pattern

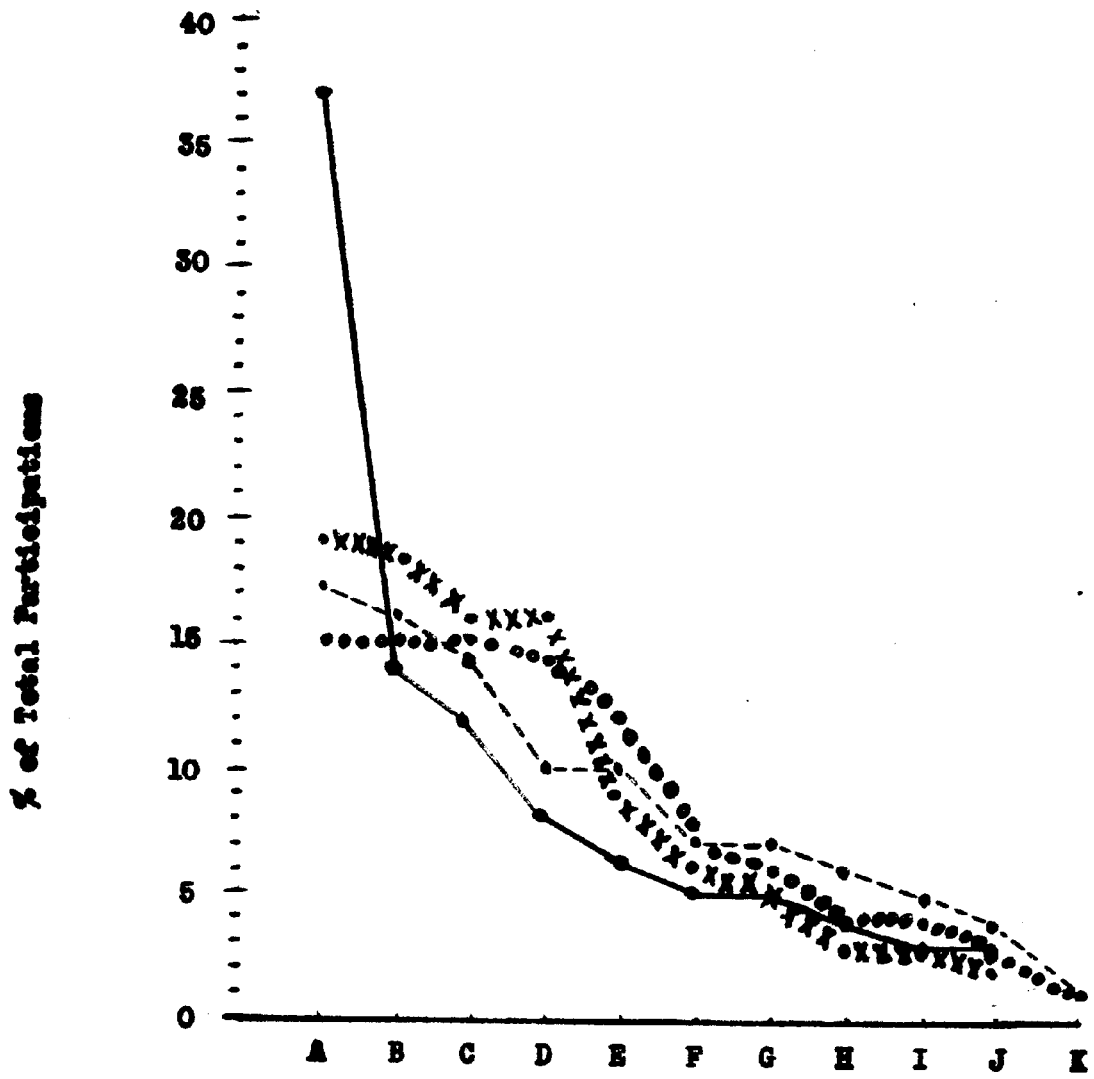
A participation is defined as the remarks of a group member or leader which occur between those of other members. The percentage of the total number of participations accounted for by each individual in each group was computed. These data are plotted in Figure 2.

With the exception of the leader performance in Group 1, the general distribution of participations over the members of the group is very similar for all groups. If all participations were distributed equally, the per cent score for participants would be 10% in Groups 1 & 4 and 9% in Groups 2 & 3. The graph indicates that in all groups there were from five to six persons who contributed less than this expected figure.

There is indication in the data that extent of participation is related to proximity to the leader. Of the eight highest participators (the two highest from each group), seven were seated in the half of the table nearest the leader. The difference in extent of participation between those sitting nearest and those sitting farthest from the leader

FIGURE 2

PARTICIPATION GRADIENTS



Participant Number

A-1	1	3	1	7	6	5	10	9	2	4	
A-4	1	2	3	7	10	8	4	2	6	9	
A-2	2	10	1	7	8	1	6	4	3	9	8
A-3	1	7	10	1	2	4	8	5	9	6	3

A-1 ■■■■■■
 A-4 ■■■■■■
 A-2 - - - -
 A-3 ●●●●●

is significant at the 5% level.

The leader participated more actively in Groups 1 & 4, than he did in Groups 2 & 3. In terms of percentage of the total number of participations, the leader's participation score was 37% in Group 1, 16% in Group 4 and 14% in Groups 2 & 3.

2. Pace and spread of participation

The per cent of total participations occurring within each of the four 15-minute intervals was computed to determine the pace of the conference and the points of greatest intensity of discussion. Table 40 shows the per cent of participations for each group for each of the four fifteen-minute intervals. In each of the four groups, the final period had a higher percentage of the participations than any of the other periods. The mean for all four groups dropped slightly in the second fifteen-minute interval followed by an increase in the third and fourth periods. None of the differences between the sets of groups is significant.

To determine how widespread the participation was in each of the periods the number of different participants in each of the intervals was counted. The results show that participation was fairly widespread. At least six different people participated in each of the fifteen-minute intervals for each of the groups.

3. Summary

The leadership style differences did not produce material differences between the two sets of groups in over-all participation pattern. All groups had an equally large number of active participants

TABLE 40

PERCENTAGE OF TOTAL PARTICIPATIONS
IN EACH QUARTER-HOUR

<u>Group</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>
A - 1	25.98	23.45	22.01	28.51
A - 2	18.14	21.64	29.28	30.87
A - 3	24.35	20.71	19.99	34.89
A - 4	23.28	18.43	26.68	31.53
1 - 4	22.90	21.00	24.40	31.40

throughout the conferences. In all groups the largest percentage of participations occurred during the last fifteen-minutes of the hour conference. Extent of participation was significantly related to distance from the leader: those nearest the leader did significantly more participation than those farther from the leader.

B. The Relationship between Extent of Participation and the Process Variables

1. The relationship of extent of participation to interpersonal variables

The correlation between extent of participation and the interpersonal variables is shown in Table 41. The group appeared no more unified to the high participator than it did to the low participator. This is true in both sets of groups as well as in all groups combined. Extent of participation is significantly correlated at the 5% level with the extent to which the person felt accepted. Whether feeling accepted results in higher participation or higher participation creates the feeling of being accepted cannot be deduced from the design.

The extent to which the high participator was accepted as a person differed in the two sets of groups. While neither of the coefficients in the two sets are significantly different from zero, they are significantly different from each other. In Groups 1 & 4 the high participators tended to be liked less and in Groups 2 & 3 they tended to be liked more than the low participators. Evidently, whether or not the high participator is liked by his colleagues depends on the situation in which the high participation takes place and upon the functions which are performed by the participators.

TABLE 41

CORRELATION BETWEEN EXTENT OF PARTICIPATION
AND INTERPERSONAL VARIABLES

Perception of Unity (QIII, 13 - QIV, 1)	.005
Feeling Accepted as Member (QIV, 8)	.38*
Acceptability as Participant to Others (QIII, 9 - QIV, 9)	.02 (1 & 4) .64 (2 & 3)**
Acceptability as Person to Others (QIII, 10)	-.31 (1 & 4) .20 (2 & 3)
Personal Liking for Leader (QIV, 7)	-.07

** Significant at the 1% level

Additional evidence of the differential attitude toward high participators in the two sets of groups is provided by the relationship between extent of participation and the acceptability of the individual as a participant. In Groups 1 & 4 the high participator was no more highly regarded than was the low participator. In Groups 2 & 3 the relationship is significantly positive at the 1% level.

The finding for Groups 1 & 4 is in marked contrast to that reported by Norfleet(12). She reports correlation of .95 and .94 in two groups between extent of participation and the productivity rating given the participant by his colleagues. She points out that her groups were mature groups. The participants had learned to limit their contributions to those which are productive. She suggests that in a new group a much lower correlation would be expected. Since the two sets of groups in this experiment are equally "new", the differential relationship between extent of participation and acceptability as a participant cannot be accounted for on this basis. The difference in attitude toward the high participator in the two sets of groups must be due to differences in the two situations. This possibility will be discussed after the relationship of extent of participation and problem-solving scores has been reviewed.

Extent of participation is unrelated to personal liking for the leader. This was true for both sets of groups, even though Groups 1 & 4 liked the leader better than did Groups 2 & 3. In other words, regardless of the attitudes of the groups toward the leader personally, the extent to which the individual participated is unrelated to personal liking for the leader.

2. The relationship of extent of participation to problem-solving scores

Table 42 shows the correlation between extent of participation and the extent to which the participant performed the various problem-solving functions, using his total performance as the base, the % Own score.

Extent of participation is apparently unrelated to the relative amount of goal-setting, information-giving, development-seeking and giving, opposing and summarizing done by the participant. In both sets of groups the high participators had a lower percentage of their contributions in the solution-proposing category than did the low participators. This suggests that a person is likely to make a solution proposal early in his participations. Other types of contributions come later, if at all.

There are two instances in which extent of participation is differentially related in the two sets of groups to problem-solving function scores. In Groups 1 & 4, the high participators tended to do relatively more information-seeking; in Groups 2 & 3, the high participators did relatively less than did the low participators. In Groups 1 & 4, the extent of participation is unrelated to the relative amount of supporting done; in Groups 2 & 3, the high participators did relatively more supporting than did the low participators. Both these differences may explain why the high participators were so highly regarded in Groups 2 & 3 and were no more valued than the low participator in Groups 1 & 4. The high participators had different values for their colleagues in the two situations. The information-seeking function is a dependent

TABLE 42

CORRELATION BETWEEN EXTENT OF PARTICIPATION
AND PROBLEM-SOLVING SCORES (% OWN)

Goal Setting	-.05
Information Seeking	.30 (1 & 4) -.41 (2 & 3)
Information Giving	.26
Solution Proposing	-.46**
Development Seeking	.08
Development Giving	.24
Opposing	.01
Supporting	-.15 (1 & 4) .57 (2 & 3)**
Summary Giving	-.05 -.17 .18

** Significant at the 1% level

one; the seeker asks for help. This was a distinctive characteristic of the high participator in Groups 1 & 4. On the other hand, in Groups 2 & 3 the high participator was a source of help; he provided support for others. This doubtless had additional significance in Groups 2 & 3 because of the high level of opposing behavior generally and on the part of the leader especially.

The correlations between the % Category score and extent of participation are shown in Table 43.

The high participators in both sets of groups were responsible for most of the behavior in all but a few categories. This is especially true of development-giving. However, the % Category scores are not solely a function of the extent to which the person participates. The high participators did no more information-seeking or summarizing than did the low participators.

It is quite possible also that in other conferences, the relationship between extent of participation and the % Category score might be quite different than is reported here. In a conference composed primarily of naive participants with one expert, extent of participation might show a high correlation with the amount of the information-seeking that the person did, but correlate very low with other functional scores.

There are data from another source which help to explain why the high participator was highly regarded in Groups 2 & 3 and was regarded no more highly than anyone else in Groups 1 & 4. It was pointed out in connection with the leader's problem-solving behavior that the leader in Groups 1 & 4 accounted for significantly more of the goal-setting, solution-proposing, development-seeking and giving, supporting and summarizing-giving

TABLE 43

CORRELATION BETWEEN EXTENT OF PARTICIPATION
AND PROBLEM-SOLVING SCORES (% CATEGORY)

Goal Setting	.75** .49 .61**
Information Seeking	.45 .01 .22
Information Giving	.69** .56** .62**
Solution Proposing	.57* .64** .61**
Development Seeking	.80** .40 .58**
Development Giving	.91** .93** .92**
Opposing	.77** .80** .77**
Supporting	.63** .92** .77**
Summary Giving	.45 .14 .28

* Significant at the 5% level
** Significant at the 1% level

than he did in Groups 2 & 3. In Groups 2 & 3, however, these important functions were performed more frequently by group members. Table 43 indicates that for most of these categories, it was the high participator who performed the function. Thus we have high participators in the two groups differing not only in the way they distribute their contributions over the problem-solving functions but also in the extent to which they performed important problem-solving behaviors. That is, although there was a similarly strong tendency in both sets of groups for high participators to be responsible for most of the behavior in most of the problem-solving categories, the amount of the total behavior for which the high participator was responsible was greater in Groups 2 & 3 than in Groups 1 & 4. The high participators in Groups 2 & 3 performed the important functions in the problem-solving process. They "carried" the discussions. Hence, they were liked by their fellows and regarded as helpful and worthwhile. In Groups 1 & 4 the high participators carried much less of the burden, performed a smaller percentage of the important functions. They tended to be liked less than their less vocal colleagues and were not singled out as particularly helpful. It may be that because the leader in Groups 1 & 4 was performing these necessary functions in what the group considered to be a satisfactory manner, the high participators were regarded as competing with the leader; hence the tendency toward disliking the high participators in Groups 1 & 4.

3. Summary and conclusions

The extent to which a person participates is a function of the extent to which he feels accepted. It is not related to attitude toward

the leader nor to his perception of unity of the group. Whether extent of participation is related to attitudes of the other participants toward him, as a person and as a member, depends on the total situation. In this study, three process factors have been suggested as having bearing on these relationships: the kinds of problem-solving functions the high participator performs, the extent to which he performs these functions and the group's attitude toward his performing those functions.

In Groups 1 & 4 the high participators did relatively more information-seeking and no more supporting than did the low participators. In Groups 2 & 3 the high participators did relatively less information-seeking and relatively more supporting than did the low participators. The high participators made a relatively greater number of the important problem-solving contributions than did the high participators in Groups 1 & 4. These differences are possible explanations for the fact that in Groups 1 & 4 the high participators were less liked personally and were not regarded as more helpful than low participators while in Groups 2 & 3 the opposite was true. It is also possible that since the members of Groups 1 & 4 regarded their leader as doing an adequate job, they were resentful of these functions being taken over by other members.

C. The Relationship of Extent of Participation to Conference Outcomes

1. The relationship of extent of participation to the quality of individual solutions

Much of the emphasis on the need for participation in the common sense literature assumes that more learning takes place with more participation. The experimental design permitted a partial test of this hypothesis, since the quality of each solution was measured. The correlation between

the amount of agreement between the individual's solution and the criterion solution and the extent to which he participated is .11 for all four groups combined. The high participator did not show any greater agreement with the external criterion than did the low participator. This near zero correlation is not due to the fact that no gains in quality were made. As was pointed out in connection with the quality score, there were individual differences in amount of improvement as a result of the conference. It merely indicates that the extent to which the participant improved was not related to the amount he participated.

2. The relationship of extent of participation to measures of participant satisfaction

Satisfaction with decision.- Even more frequently hypothesized than the relationship between participation and improved quality is that between participation and the satisfaction on the part of participants - satisfaction with the discussion as well as with the product(s) of the discussion.

Table 44 shows the relationship between the extent to which the individual participated and his satisfaction with the group decision, with leader performance and with the group process.

In neither set of groups is there a significant relationship between extent of participation and participant satisfaction with decision. There is a suggestion in the data that the relationship is different in the two sets of groups. In Groups 1 & 4 the correlation is $-.24$; in Groups 2 & 3 the coefficient is $.11$. The difference is not significant, however; the composite coefficient is given in Table 44.

This finding suggests that there is no necessary significant

TABLE 44

CORRELATION BETWEEN EXTENT OF PARTICIPATION
AND SATISFACTION MEASURES

Average Satisfaction with Process (QIV, 5 - QIII, 5)	.01
Satisfaction with Leader Performance (QIV, 6)	.12
Average Satisfaction with Decision (QIII, 1, 6, 8)	-.08

relationship between active participation and satisfaction with the group product. The suggestion of a differential relationship in the two sets of groups, together with the fact that the high participators differed in the extent to which they were responsible for important behaviors, indicates that the relation between the two variables may depend more upon the kinds of functions performed and the situation in which the behavior takes place than upon the sheer extent of participation.

Satisfaction with group process.- The correlation of $+0.01$ for all four groups combined between extent of participation and satisfaction with process, indicates that the high participator was no more satisfied with the manner in which the group proceeded to its solution-decision than was the low participator. The judgment of group process is by definition more a judgment of his own behavior for the high participator than it is for the case of the low participator. Hence, we can conclude that the high participator was no more pleased with his own behavior than were those who observed it. The negative way of stating this is perhaps more interesting. The low participator was no less satisfied with the way others performed than were those who did the performing.

Satisfaction with the leader.- The extent to which the individual participated and his satisfaction with leader performance correlate $+0.12$. This absence of significant relationship holds for both sets of groups. This finding is also contrary to expectations. It might have been expected that in Groups 1 & 4, which were significantly more satisfied with leader performance than Groups 2 & 3, the relationship would be significantly positive. The participants most satisfied with the leader performance would participate more because the leader was supportive and helpful. In

Groups 2 & 3, however, a significantly negative relationship might be expected, on the grounds that the high participators were those who were most frustrated by the failure of the leader to perform certain functions. Evidently the perception of the adequacy or inadequacy of the leader is not a determinant of the extent to which the individual participates.

It may be that in groups more sophisticated as to group process and leader performance that perception of leader failure might lead to greater participation. It must be remembered, however, that even in these groups there was an awareness of the leader deficiencies.

The general lack of relationship between extent of participation and satisfaction with leader behavior suggests the leader is a much less potent force in controlling the participation pattern than is commonly thought to be the case.

3. Summary and conclusions

The extent to which the individual participated in the group discussion was not significantly related to the quality of his solution as measured by agreement with the external criterion. The high participator showed no greater qualitative gain as a result of the conference than did the low participator.

Extent of participation is unrelated to satisfaction with the manner in which the group proceeded, satisfaction with the leader's performance or satisfaction with the group's decision-solution.

All of these findings are contrary to common-sense expectations. It has been suggested that the nature of the functions performed in the participations is a more important and meaningful factor than sheer extent of participation.

VI. Functional Patterns

A. Introduction

An important part of the theoretical framework for this experiment is the concept of functional patterns. The extent to which the individuals in the group feel the other members are performing useful functions operates directly on such outcomes as satisfaction with decision. Another level of analysis based upon the concept of functional patterns has to do with the functions the individual perceives himself as playing, his perception of the functions of others and their perception of his functions. It was hypothesized that an important determinant of satisfaction is the extent of the discrepancy between the individual's perception of the functions he performs and the perceptions by his colleagues of his functions. Another factor related to the participant's satisfaction with process is the extent of discrepancy between the functions the individual aspires to perform and the functions he perceives himself performing.

These formulations require extensive methodological investigation before final testing of these hypotheses is possible. It is necessary to know whether participants perceive patterns of behavior on the part of other participants, whether they perceive themselves as performing a pattern of functions and finally whether they aspire to any particular functional pattern. It is necessary to determine whether there is more than chance agreement among the participants as to the appropriate functional pattern for a particular person. This section describes the results of a preliminary investigation of these questions.

The functional pattern questionnaire (see Questionnaire V B,

Appendix B) consisted of short descriptions of behavior. The descriptions were written in terms of the functions the individual performed with respect to the problem and with respect to interpersonal relations. Each description contained a number of functions involving either problem-solving or interpersonal relations; these are referred to in the following discussion as functional patterns. Seven problem-solving and five interpersonal descriptions were prepared. The participants in each conference group indicated the description which was most applicable to each participant. In addition, each member selected the description which best applied to him, and also the function pattern to which he aspired. Finally, he indicated how closely he felt he was able to approximate this aspired pattern. The participants were permitted to classify an individual under more than one description. The observers also completed the questionnaire.

B. Experimental Findings

1. Reliability of pattern designations

Two approaches were made to determine the extent of agreement among observers as to the appropriate functional description for a person. The first consisted of calculating the percentage of times each pair of observers agreed on one or more classification for an individual. The total number of agreements possible was thirty-eight (the number of participants). The results of this analysis are shown in Table 45. The figures in the table are minimum quantities since several observers failed to classify some participants. The data indicate that pairs of observers agreed on at least one description for about half the

TABLE 45

EXTENT OF AGREEMENT AMONG OBSERVERS

(Case was counted as an agreement if the O's agreed on at least one classification = Total Possible 38)

Problem-Solving Functional Patterns

	Ma	Gu	Ho	He	Mi	Sh	
Ma		39	58	63	47	53	
Gu			66	47	47	47	
Ho				76	63	63	Av. = .56
He					53	68	
Mi						53	
Sh							

Interpersonal Functional Patterns

	Ma	Gu	Ho	He	Mi	Sh	
Ma		58	55	47	45	42	
Gu			53	63	37	47	
Ho				76	55	53	Av. = .52
He					37	55	
Mi						50	
Sh							

participants and that the extent of agreement was the same for both problem-solving and interpersonal designations. The interpretation of these agreement figures is difficult since the observers varied in the number of placements they made. However, some notion of the chance agreement that might be expected is provided by the following considerations. With seven categories, as was the case with the problem-solving descriptions, the chance figure between two observers, each of whom made only one placement per participant, is one out of seven, or 14%. An attempt to approximate the maximum chance value in present data was made by taking the two observers who made the largest number of placements. Each made approximately two placements per participant. The chances of perfect agreement on both placements is 8%. The actual agreement shown by this pair was 76%.

The second approach took into account the number of placements made by each observer. The number of placements made by each observer was used as a base for computing the extent to which others agreed with him in the placements he did make. This procedure resulted in slightly lower agreement figures; the average agreement figure was approximately 45%, combining the data from both types of role descriptions. The agreement figures were approximately the same when the individual was used as a base and when others were used as the base. It appears, then, that the observer agreement obtained is much greater than would be obtained by chance.

The problem of the extent to which participants agree with each other might conceivably be approached in the same fashion as was done with observers. However, it was felt that the laborious device of computing

percent agreement figures for all pairs of participants could be dispensed with and the same purpose achieved by a statistic which would tell us the probability that a participant was correctly classified by a single participant or observer. This value can be derived from the actual amount of agreement among participants. It was decided that a description or pattern designation would be applied to an individual if one-half or more of the classifiers agreed that it was applicable. Using this criterion, the probability of a correct classification of a participant by another is .93, with from nine to ten people in a group*.

The designations which were applied to each of the participants on the basis of classifications made by their colleagues are, therefore, highly reliable.

2. Extent of agreement between different functional designations

Each participant received four functional pattern designations. One was given to him by his colleagues, and another by observers. Two were assigned by the individual himself, one was the pattern he perceived as being appropriate and the other, the functional pattern he aspired to. This section describes the extent to which there was agreement among these types of designations. The percentage agreement figure was obtained by dividing the number of functional pattern designations on which there was agreement by the average number of designations made by each method.

*The derivation of this probability figure is given in Appendix F.

The extent to which there was agreement in the designations applied by participants and by observers is of considerable theoretical importance. It is in effect asking whether the behavior of an individual in a group is perceived in the same fashion by an objective observer as it is by a fellow participant. The extent of agreement figures were 50% for problem-solving pattern designations and 54% for interpersonal pattern designations. This indicates that the participants and the observers perceived a considerable part of each person's behavior quite differently.

Another problem of theoretical importance is the extent to which the individual's perception of himself is similar to the way he is perceived by his fellows. Is the participant's perception of the functions he is performing the same as those of his colleagues? Thirty-one percent of the problem-solving functional patterns chosen by the participant for himself were agreed with by his fellow participants. The extent of agreement figures for the interpersonal role designations was 34%. There is, then, considerable discrepancy between self-perceptions and the perceptions of the colleagues. The agreement is no greater between self-perceptions and the observers' designations. The observers' designations and the self-designations were in agreement 34% of the time for problem-solving patterns and 33% for interpersonal patterns.

The extent of agreement between the functional pattern designated by the individual for himself and the pattern to which he aspired is, in a sense, an index of frustration. The lower the agreement figure for the total of 38 participants, the larger the number of participants who perceived themselves as performing a different pattern of functions from

the one to which they aspired, i.e., the more participants whose efforts were frustrated. For 51% of the participants, there was congruence between the problem-solving pattern to which they aspired and the problem-solving pattern they perceived themselves as playing; 65% of the participants showed congruence between the interpersonal functional pattern aspired to and the functions they perceived themselves as performing.

It seemed desirable to determine the extent of agreement between the functional descriptions applied to an individual and his actual behavior. This was possible for the problem-solving functional patterns since the functions each person performed were coded from the typescript. There were, however, several problems: one was that not all the behaviors listed in the pattern descriptions were isomorphic to the problem-solving functional categories. The second was that each description consisted of a number of functions, while the problem-solving scores were derived for single functions only. Thus, it was necessary to translate the problem-solving categories into the functional pattern descriptions of the questionnaire. Two coders, working independently, assigned to each description the functional categories which they thought were appropriate to that description. Thus, for example, solution-proposing was deemed the appropriate function for description D, the "idea man". There was very high agreement between the two coders; they agreed on 13 of the 15 functions assigned to the 7 functional patterns. On the few points of disagreement a compromise code was decided upon. The functions which the coders agreed were prescribed by each of the descriptions were as follows:

Description A, the reality tester: goal-setting, problem-proposing, opposing and development-giving.

Description B, the expert: information-giving.

Description C, the interrogator: information-seeking, development-seeking and summary-seeking.

Description D, the idea man: solution-proposing.

Description E, the goal reminder: goal-setting, summary-seeking, summary-giving.

Description F, the distractor: non-problem directed comments.

Description G, the passive participant: opposing and supporting.

Using these functional definitions of the descriptions, the two coders studied the problem-solving scores of each participant and independently decided upon the appropriate functional pattern for each participant. In addition to considering the % Own and % Category scores, the coders took into account the extent to which the individual participated and the amount of behavior present in a given category. Using the same formula that was used for calculating the amount of agreement in designations derived from different sources, the two coders agreed on 86% of the role designations. They agreed perfectly on 26 of the 42 participants in the four groups, including the leader. Where there was disagreement, a negotiated designation was made. These functional pattern designations were then compared with the designations derived from the classifications of the participants, the observers and participant himself.

Forty-seven percent of the designations assigned to each person by the participants were in agreement with the designations based on actual problem-solving behavior. The agreement figure was 45% with

descriptions assigned by observers and 36% with designations made by the participant himself. These results indicate that there is a considerable discrepancy between the functional pattern the person actually shows and the pattern he is perceived as playing by his colleagues, by observers and by the person himself. Although the differences in per cent agreement are not significant, the data suggest that the person himself is least accurate.

In summary, the comparisons of the functional patterns designations as assigned by the other participants, by observers, by the participant himself and as derived from analyses of behavior indicate that there is a good deal of discrepancy among the various methods of designating the functional pattern of individuals. The pattern perceived for an individual by his colleagues differs from that perceived for him by observers and from the pattern as perceived by the individual himself. All of these differ from descriptions which are appropriate on the basis of objective measures of behavior. These findings are not due to unreliability of the designations themselves, however. The participants are capable of making process or functional observations and show greater than chance agreement. The findings merely indicate that the same behavior is perceived differently by these different groups.

There is a methodological consideration which is pertinent in this connection. One can think of specialization of functions in two ways. One can look at the individual himself and note which function he performs with greater frequency than he performs any other. If a particular function is predominant, one might say the individual specialized in that function. On the other hand, it is also possible to characterize an individual in terms of the proportion of times a given function was

performed by others. This distinction is illustrated in the following conversation:

Jones: "All Brown did was criticize."

Smith: "He didn't do any more criticizing than anyone else."

Jones is applying a designation on the basis of the individual's total performance. Smith uses the group and the amount of criticizing done by the group as a whole as the basis for his description. Unfortunately, the functional pattern questionnaire did not prescribe for the participants which frame of reference was to be used and it is probable that both frames of references were used. This methodological caution does not, however, negate the conclusions reached above. Whatever frame of reference or mixture of frames of reference were used were probably present in all groups assigning functional patterns. The coders who applied functional pattern descriptions to actual behavior deliberately used both frames of reference.

3. The functional pattern characteristics of the groups

It will be recalled that a pattern description was applied to an individual when 50% or more of the participants, or observers, agreed that it was appropriate. Application of this criterion indicated that there were three types of persons in the groups: Single pattern persons, those on whom there was criterion agreement on the appropriateness of a single description; multiple patterned persons, those on whom there was 50% or more agreement on the appropriateness of several descriptions and non-patterned persons, those on whom there was less than criterion agreement on all functional patterns. Groups in which individuals perform several

patterns might differ from groups in which all participants perform only one pattern in satisfaction with group process and group decision, as well as in quality of decision. When the various problem-solving patterns, for example, are spread throughout the group the resources of the group are more likely to be fully exploited than when functional patterns are localized. Accordingly, the groups were compared as to the number of persons in each of these categories. The results are shown in Table 46. There are no significant differences between groups or between sets of groups in the number of individuals in each category. This is true for all three types of designations. The greater incidence of multiple-pattern persons in Groups 2 & 3, based on the problem-solving behavior, approaches significance at the 5% level.

Theoretically the functional patterns differ in their effects on the problem-solving process and on interpersonal relations. Each of the functional patterns was classified in terms of its effect on the problem-solving process or in terms of its effect on interpersonal relations. The groups could then be compared as to the incidence of functional patterns having positive, negative and neutral effects. The following categories, together with their definitions, were used.

Positive -- The behavior described would facilitate the progress of the group in coming to a decision and would promote the quality of the discussion. In the case of interpersonal patterns, the behavior described would promote good interpersonal relations and would have the general effect of making the group work together congenially as persons with a considerable measure of personal liking.

Negative -- The behavior described would impede the problem-solving process and impair the quality of the solution or, in the case of interpersonal relations, would interfere with or reduce good interpersonal relations, would tend to suppress we-feeling and personal liking among participants.

TABLE 46

FREQUENCY OF SINGLE PATTERN, MULTIPLE PATTERN
AND NON-PATTERNED PERSONS

As Determined from Observer Designations

	Problem-Solving			Interpersonal		
	Single Pattern	Multiple Pattern	Non-Patterned	Single Pattern	Multiple Pattern	Non-Patterned
A - 1	6	3	0	A - 1	5	2
A - 4	3	4	2	A - 4	8	1
A - 2	4	4	2	A - 2	7	2
A - 3	7	3	0	A - 3	8	1

As Determined from Participant Designations

	Problem-Solving			Interpersonal		
	Single Pattern	Multiple Pattern	Non-Patterned	Single Pattern	Multiple Pattern	Non-Patterned
A - 1	4	2	3	A - 1	7	0
A - 4	6	2	1	A - 4	7	1
A - 2	6	2	2	A - 2	8	1
A - 3	5	2	3	A - 3	5	1

% Agreement O's vs. P's = 58%

% Agreement O's + P's = 60%

As Determined from Problem-Solving Behavior

	Single Pattern	Multiple Pattern	Non-Patterned
A - 1	4	2	3
A - 4	4	4	1
A - 2	3	5	2
A - 3	0	7	3

Neutral -- The behavior described would have little or no effect upon the problem-solving process or interpersonal relations.

There was perfect agreement among the raters as to the appropriate classification of each functional pattern. Problem-solving patterns of reality tester (A), expert (B), interrogator (C), idea man (D), and goal reminder (E) were classified as positive; distractor (F) as negative, and passive participant (G) as neutral. Interpersonal roles of supporter (I) and social oiler (J) were regarded as positive; rejector (H) and dictator (L) as negative, and isolate (K) as neutral.

In the following paragraphs, in which the descriptions of the groups in terms of patterns will be presented, this classification of functional patterns in terms of their positive, negative or neutral effects will be utilized. The value, in these terms, of each pattern will be designated in the tables by means of +, - and 0, respectively.

Table 47 shows the number of persons receiving each pattern designation on the basis of classifications made by colleagues. A pattern designation was assigned to an individual when 50% of classifiers agreed the pattern was appropriate. Since several participants received more than one designation, the number of persons in the table exceeds the actual number in each group. While none of the differences between groups or between sets of groups are statistically significant, several of them are helpful in the understanding of results reported elsewhere in this report. In addition, traditional tests of significance are inadequate for purposes of interpreting data such as these. The presence of two rejectors in a group of ten may make that group quite different psychologically than a group with no rejector, even though the difference is not statistically significant.

TABLE 47

THE NUMBER OF PARTICIPANTS RECEIVING EACH PATTERN DESCRIPTION,
AS CLASSIFIED BY COLLEAGUES

Problem-Solving Patterns														
Reality Tester (Pattern A)	Expert (Pattern B)	Interrogator (Pattern C)	Idea Man (Pattern D)	Goal Reminder (Pattern E)	Distractor (Pattern F)	Passive Participant (Pattern G)	Non-Patterned	Interpersonal Patterns						
								Reflector (Pattern H)	Supporter (Pattern I)	Social Oiler (Pattern J)	Isolate (Pattern K)	Dictator (Pattern L)	Non-Patterned	
A-1	4	0	0	2	0	1	3	2	0	0	0	2	0	2
A-4	1	2	1	2	0	4	1	2	0	0	0	2	1	1
A-2	3	2	0	3	0	2	2	0	1	0	0	2	1	2
A-3	2	3	0	2	0	3	2	0	0	0	0	2	1	3

In Groups 2 & 3 fewer persons were perceived in the negative role of rejector and more persons were classified as supporters than in Groups 1 & 4. This helps to account for the high degree of satisfaction with group process in Groups 2 & 3, in spite of the disruptive behavior of the leader. It also substantiates the observation (see the Relationship Among Interpersonal and Problem-Solving Variables) that opposing and supporting had different significance in the two sets of groups. In spite of the relatively higher incidence of opposing contributions in Groups 2 & 3, only one person was regarded as a rejector. In Groups 1 & 4, with a lower relative incidence of opposing, 4 of the 18 people were perceived as rejectors. The 18 participants in Groups 1 & 4 made 194 pattern classifications; of these, 32% were negative pattern classifications. The 20 participants in Groups 2 & 3, made 233 pattern classifications; of these 23% were negative classifications.

There is no significant difference between the sets of groups in the patterns assigned to the leader by the participants. In Groups 1, 3 and 4 the leader was perceived as playing the functions of the interrogator (Desc. C) and goal reminder (Desc. E). In Groups 2 only the interrogator pattern was assigned to the leader. Only one participant perceived the leader as a distractor. In Group 1 the leader was perceived as performing the interpersonal functional patterns of supporter and social oiler. In Groups 2, 3 & 4, only the social oiler pattern was assigned to the leader. Three of the participants in Groups 2 & 3 perceived the leader as a rejector; none of the participants so classified the leader in Groups 1 & 4. No participant perceived the leader in the negative dictator or dominator patterns.

It has been pointed out, in connection with the problem-solving behavior of the leader, that he actually did perform differently in the two sets of groups. However, the pattern descriptions selected for the leader in all groups describe the behavior which is commonly expected of the leader. The failure of the participants in Groups 2 & 3 to note a discrepancy between this stereotype and the leader's actual behavior is a special instance of the low degree of agreement between the perception of participants and actual behavior as measured objectively.

There were no statistically significant differences between sets of groups in the patterns assigned to the participants by the observers, shown in Table 48. The observers perceived more persons performing the functions of goal reminder in Groups 2 & 3 than in Groups 1 & 4. This is one of the patterns assigned to the leader by the participants. The observers also perceived more people performing the social oiler functions in Groups 2 & 3 than in Groups 1 & 4, a functional pattern assigned to the leader by the participants in three of the four groups. The observers thus perceived more participants in Groups 2 & 3 specializing in certain leader functions, as defined by the participants themselves.

The functions the participants perceived themselves as performing are shown in Table 49. More than half the thirty-five who responded perceived themselves as performing the positive problem-solving functions of reality tester or idea man. Four of the thirty-five individuals, two in each set of groups, perceived themselves as passive participants. All perceived themselves as fitting into a pattern, and no one perceived himself as a distractor. Of the 33 who indicated their interpersonal pattern,

TABLE 46

THE NUMBER OF PARTICIPANTS RECEIVING EACH PATTERN DESCRIPTION,
AS CLASSIFIED BY OBSERVERS

	Problem-Solving Patterns							Passive Participant Non-Patterned (Pattern G)
	Reality Tester (Pattern A)	Expert (Pattern B)	Interrogator (Pattern C)	Idea Man (Pattern D)	Goal Reminder (Pattern E)	Distractor (Pattern F)	0	
A-1	4	1	2	2	1	1	4	0
A-4	3	2	1	3	1	1	3	2
A-2	1	2	0	3	3	1	2	2
A-3	2	1	1	4	2	1	2	0

	Interpersonal Patterns					Dictator (Pattern L)	Non-Patterned
	Reflector (Pattern H)	Supporter (Pattern I)	Social Oiler (Pattern J)	Isolate (Pattern K)	0		
A-1	2	2	0	4	1	2	0
A-4	1	3	0	4	2	0	0
A-2	2	3	1	3	2	1	1
A-3	3	2	2	2	1	1	1

TABLE 49

FUNCTIONAL PATTERNS APPLIED BY PARTICIPANTS
TO THEIR OWN BEHAVIOR

Problem-Solving Patterns													
Interpersonal Patterns													
Problem-Solving Patterns													
Interpersonal Patterns													
Problem-Solving Patterns													
Reality Tester (Pattern A)	Expert (Pattern B)	Interrogator (Pattern C)	Idea Man (Pattern D)	Goal Reminder (Pattern E)	Distractor (Pattern F)	Passive Participant (Pattern G)	Non-Patterned	Reflector (Pattern H)	Supporter (Pattern I)	Social Oiler (Pattern J)	Isolate (Pattern K)	Dictator (Pattern L)	Non-Patterned
A-1	2	1	2	2	0	0	0	A-1	1	3	0	1	0
A-4	2	0	1	2	0	2	0	A-4	5	0	0	0	0
A-2	5	0	0	1	0	1	0	A-3	0	1	1	0	0
A-3	3	1	1	4	0	1	0	A-2	7	2	1	2	0
Interpersonal Patterns													
A-1	4	1	3	0	1	1	0	A-1	4	3	0	1	0
A-4	3	5	0	0	0	2	0	A-4	5	0	0	0	0
A-3	0	7	1	1	0	1	0	A-3	0	1	1	0	0
A-2	1	2	2	1	0	1	0	A-2	2	2	1	2	0

almost half perceived themselves as supporters. Two persons, one each in Groups 2 & 3 perceived themselves as isolates. Of the eight individuals who perceived themselves as rejectors, seven were in Groups 1 & 4. This again indicates that opposing, which was, in fact, much more frequent in Groups 2 & 3 than in Groups 1 & 4, was not perceived as rejecting in Groups 2 & 3, either by the opposer or by those being opposed. The exact opposite appears to be true in Groups 1 & 4.

The number of persons aspiring to perform each pattern is shown in Table 50. The pattern aspirations were very similar in the two sets of groups. More than two-thirds of thirty-five participants who indicated their problem-solving pattern aspiration were attempting to be reality testers or idea men. Only five persons were aspiring to patterns assigned by the participants to the leader, the interrogator and goal reminder patterns.

Of the thirty-eight participants, thirty-three aspired to the interpersonal behavior patterns of supporter or social oiler. The incidence of persons aspiring to the social oiler pattern is higher in Groups 2 & 3 than in Groups 1 & 4, which may also account in part for the high level of satisfaction with process in those groups, despite the leader's behavior.

In a sense, these aspired pattern designations provide a ranking of the social acceptability of the various patterns of behavior. Interpreted in this fashion, the reality tester and idea man are the most acceptable problem-solving functional patterns, with the expert pattern third. The interrogator and goal reminder patterns may not have been regarded by the participants as member patterns; at least they do not have much appeal. The patterns of supporter and social oiler are the most acceptable

TABLE 50

THE NUMBER OF PARTICIPANTS WHO ASPIRED
TO EACH FUNCTIONAL PATTERN

Problem-Solving Patterns										
Reality Tester (Pattern A)	Expert (Pattern B)	Interrogator (Pattern C)	Idea Man (Pattern D)	Goal Reminder (Pattern E)	Distractor (Pattern F)	Passive Participant (Pattern G)	Non-Patterned			
+	+	+	+	+	-	0				
A-1	3	0	1	1	0	0	0			
A-4	1	0	2	0	0	0	0			
A-2	0	1	2	2	0	0	0			
A-3	1	0	3	1	0	0	0			

Interpersonal Patterns						
Rejector (Pattern H)	Supporter (Pattern I)	Social Oiler (Pattern J)	Isolate (Pattern K)	Dictator (Pattern L)	Non-Patterned	
-	+	+	0	-		
A-1	6	2	0	0	0	0
A-4	6	1	0	0	1	0
A-2	6	4	0	0	0	0
A-3	6	2	0	0	1	0

interpersonal patterns.

The two sets of groups were compared as to the number of persons who perceived themselves performing the functions they aspired to perform. This was referred to earlier as a measure of the extent to which the individuals were frustrated in their efforts. In Groups 1 & 4, 33% of the participants perceived themselves as performing the pattern of problem-solving function to which they aspired while in Groups 2 & 3, 60% felt they had achieved the pattern they aspired to. The percentage of those perceiving themselves in the interpersonal pattern they aspired to is again lower in Groups 1 & 4 than in Groups 2 & 3; 55% perceived themselves as achieving in the former set of groups, 70% in the latter. The negative leadership style permitted more persons to feel they had achieved the pattern they aspired to than did the positive leadership style.

The final description of the groups in terms of functional patterns is provided by the designations based upon the coded problem-solving behavior. These are shown in Table 51. There are no significant differences between sets of groups with respect to the proportion of participants performing a given pattern of functions. The higher incidence of idea men in Groups 2 & 3 than in Groups 1 & 4 is congruent with the finding that Groups 2 & 3 showed a relatively higher incidence of solution-proposing than did Groups 1 & 4. There is also a slightly higher incidence of persons in Groups 2 & 3 who performed the functions of interrogator and goal reminder, which were the roles assigned the leader by the participants. If one accepts this definition of leader function, this finding indicates that there were more people in Groups 2 & 3 than in Groups 1 & 4 who were performing the leader functions. These conclusions confirm those arrived

TABLE 51

THE NUMBER OF PARTICIPANTS RECEIVING EACH PATTERN DESCRIPTION,
BASED UPON PROBLEM-SOLVING BEHAVIOR

	Problem-Solving Patterns							
	Reality Tester (Pattern A) +	Expert (Pattern B) +	Interrogator (Pattern C) +	Idea Man (Pattern D) +	Goal Reminder (Pattern E) +	Distractor (Pattern F) -	Passive Participant (Pattern G) 0	Non-Patterned
A-1	2	2	2	2	3	0	1	3
A-4	4	3	2	2	1	0	4	1
A-2	5	3	1	4	4	0	1	2
A-3	4	2	5	4	5	0	0	3

at by analysis of the individual problem-solving scores.

These several descriptions of the groups in terms of patterns indicate that the groups were not significantly different, statistically, in the patterns which were performed and in the patterns which were aspired to. This is true no matter what the source of the functional pattern designation. The non-statistically significant differences confirm the conclusion arrived at elsewhere in this report that the significance of opposing behavior was different in the two sets of groups. Fewer individuals were perceived by their colleagues as rejectors in Groups 2 & 3 than in Groups 1 & 4; fewer individuals in Groups 2 & 3 perceived themselves as rejectors than in Groups 1 & 4. The observers perceived more individuals performing leader functions in Groups 2 & 3 than in Groups 1 & 4. This finding corroborates the conclusions based on analyses of the problem-solving behavior of the participants. The negative style also produced a greater number of individuals who perceived themselves as achieving the pattern to which they aspired.

4. The relationship of functional patterns to interpersonal variables

This section concerns the relationship between the various kinds of functional patterns an individual is perceived as performing, or perceives himself as performing and his perception of the unity of the group, his feeling of acceptance, his acceptability to his fellows as a participant and as a person and his personal liking for the leader.

The number of persons who received a given particular pattern designation was small. It was impossible, therefore, to make comparisons between each pair of functional patterns on an interpersonal variable.

An alternative procedure was followed by dividing the entire group of 38 participants into top, middle and bottom thirds on each of the interpersonal variables. The proportion of persons receiving a certain pattern designation in a particular third was then compared with the proportion of participants not so classified who fell into that third. The participants with a particular role designation were thus compared with all others, rather than with persons having another role designation. This technique is, of course, similarly limited by the small number of cases in each category; however, it does provide a rough test of whether or not receiving a particular designation is related to an interpersonal variable. It does not reveal which of two patterns is most related.

Patterns assigned to the individual by his colleagues.- The problem-solving pattern the individual is perceived by his colleagues as performing is unrelated to his perception of unity, to his attitude toward the leader as a person, to his acceptability as a person. The extent to which the individual felt accepted is related to one pattern. A significantly greater proportion of those who were perceived as passive participants felt less accepted than did those perceived in other patterns. Persons perceived as reality testers and idea men were most acceptable to their colleagues as participants than others not perceived in these patterns. It will be recalled that these are the two patterns most frequently aspired to. The participants who were regarded as most valuable performed the functions which the participants perceived as being most valuable. A significantly greater proportion of those perceived as passive participants were less highly regarded than others perceived performing other functions.

The supporters tended to perceive their groups as more unified than the non-supporters. The isolates (who were, in almost every instance, also the passive participants, from the standpoint of problem-solving) felt less accepted as members and were actually less accepted as participants and as persons than those who were not perceived as isolates. None of the patterns is related to personal liking for the leader.

Patterns assigned to the individuals by observers.- The problem-solving pattern the individual performed, as judged by observers, is unrelated to his perception of group unity. The idea men and the passive participants felt less accepted than their colleagues. The passive participant was less accepted as a participant. None of the patterns is related to being accepted as a person or to personal liking for the leader.

A significantly greater proportion of the isolates felt less accepted as members than those who performed other interpersonal functions. No other relationships appeared.

Patterns assigned to the individual by himself.- The problem-solving pattern the person perceived himself as performing is unrelated to his perception of unity. It is of interest to note in this connection, however, that none of the four persons who perceived themselves as goal reminders perceived their groups as very unified. All four of the participants who perceived themselves as passive participants felt less accepted as members, and all were actually less acceptable to their colleagues as participants and as persons. The twelve persons who perceived themselves as reality testers liked the leader less than did their colleagues.

The six social criers tended to perceive their groups as being more unified than did their fellows. None of the other patterns is related to the other interpersonal variables.

Aspired patterns.- By and large the problem-solving pattern aspirations of the participants are unrelated to the interpersonal variables. There are a few relationships which approximate significance, however. None of the four participants who aspired to be goal reminders felt very accepted or perceived the group as unified. The five persons who aspired to be experts tended to like the leader better than did their colleagues.

There are no significant relationships between the interpersonal pattern aspirations of the individual and the interpersonal variables.

Other pattern scores in relation to interpersonal variables.- Do the individuals who felt they had achieved the patterns of behavior to which they aspired differ on any of the interpersonal variables from those who felt they had not? It might be expected, for example, that the ones who had not would feel less accepted and would like the leader less. With respect to problem-solving aspirations, there is no statistically significant difference between these two types of participants on any of the interpersonal variables. There was a tendency but not a statistically significant one for the persons who showed a discrepancy between aspired interpersonal pattern and their own perceived pattern to perceive their groups as less unified than did those with no discrepancy.

One of the original hypotheses was that members whose self-perceptions were in agreement with those of the group, would perceive the group as more unified than members whose perceptions were different from those of the other participants. They might also feel more accepted.

To test these hunches and to check on the possibility of other relationships, the number of individuals in the group who perceived the participant as he perceived himself was correlated with each of the interpersonal variables. None of the correlations is significantly different from zero.

Summary.- These results indicate that, by and large, the individuals perception of unity, his feeling of acceptance, his acceptability as a participant and as a person and his personal liking for the leader are unrelated to his pattern of behavior, as it is perceived by observers or by the participant himself. Nor are they related to the pattern to which he aspires. Several of the patterns as assigned to the individual by his colleagues are related to some of the interpersonal variables. The supporters perceived their groups as very unified. The passive participants and isolates felt less accepted and were less accepted as participants and as persons. Persons perceived as reality testers and idea men were more acceptable to their colleagues than other persons. These comparisons were made among positive problem-solving and interpersonal patterns, since almost no one received negative pattern designations. In other words, these results do not indicate that it makes very little difference as far as interpersonal relations are concerned what behavior pattern a person shows. They do suggest that it makes little difference, with the exceptions noted, what positive problem-solving or interpersonal functions he performs. The fact that failure to perform the functions to which the participants aspired had no relationship to interpersonal variables may be understood in the same terms. The frustration effects were not operative because there were other positive functional patterns to perform and the participants did so.

5. The relationship of functional patterns to satisfaction outcomes
Are the persons who were perceived, or perceived themselves,
performing certain functional patterns more satisfied with the group, the
leader and the decision? This section contains the results of a comparison
of the different patterns with respect to participant satisfactions. The
analysis procedure was identical to that used in determining the relation-
ship between functional patterns and the interpersonal variables.

None of the patterns assigned by participants are significantly
related to satisfaction with group process. The seven persons who were
perceived by the observers as goal reminders, one of the two patterns
assigned to the leader by the participants, were less satisfied with group
process than their colleagues. The same is true for the four persons who
aspired to that pattern. The four persons who perceived themselves as
interrogators, another pattern assigned the leader by the participants,
were also less satisfied. The fifteen participants who perceived themselves
as social oilers were also less satisfied than their colleagues.

None of the problem-solving or interpersonal patterns assigned by
participants differentiated between those who were satisfied and those who
were dissatisfied with the leader's performance. The same is true with
respect to patterns assigned by observers. The nine persons who perceived
themselves as idea men were less satisfied with the leader than were those
who perceived themselves in other patterns.

The persons most satisfied with the group's decision were those
who were perceived by their colleagues as supporters. The four persons
whom the observers classified as interrogators were in the top third in
decision satisfaction. No other relationships were found.

The hypothesis has been mentioned that those persons who perceived themselves as playing a different pattern from the one they were aspiring to, would be less satisfied with the outcomes of the conference than persons who achieved their aspirations. The individuals for whom there was a discrepancy would be frustrated, and, as a result, dissatisfied. This was tested for all three satisfaction outcomes. Those with discrepancies in problem-solving patterns do not differ from those with no discrepancies on any of the satisfaction measures. As was mentioned earlier, in almost every case, both the pattern aspired to and perceived were positive. Failure to perform a pattern of behaviors resulted in the substitution of another positive pattern. Hence, there was actually very little frustration. Discrepancy in interpersonal patterns made a difference, however. A significantly smaller number of persons with discrepancies in interpersonal patterns were very satisfied (scored in the top third) with group procedure, and a significantly greater proportion of these people were least satisfied with the group decision.

The number of persons who perceived the individual performing the same functions which he perceived himself as performing was correlated with the individual's satisfaction with the leader, the group and the decision. This is one method of testing the hypothesis that the greater the congruence between the individual and the group's perception the greater the participant's satisfaction with outcomes. The relationship might be expected to be greatest with satisfaction with group procedure; however, the other two outcomes might also be affected. The results were negative; there is no relationship between the number of colleagues who perceived the individual as he perceived himself and his standing on any

of the satisfaction variables.

C. Summary and Conclusions

1. Methodological implications

The pattern designations assigned to each participant by his colleagues are reliable. The greater than chance agreement among participants as to the appropriate pattern designation indicates that the participants were capable of making process, functional observations.

The problem-solving list of functional patterns should include more negative patterns. This would permit comparison of the relationship of positive and negative patterns to other process variables and outcome variables.

The pattern descriptions used in Questionnaire VB were strictly armchair products. The functions included under each seemed to the test constructor to belong together. There is no evidence in the results reported that they actually do occur together. One method of obtaining descriptions containing related functions was explored in another section of this report, the intercorrelations of the % Own problem-solving scores. The findings in that case are essentially negative, however. Behavioral clusters are not clear cut; in addition, the same behaviors are correlated differently in the two sets of groups. In other words, functions which form patterns of behavior in one situation might not necessarily form patterns in another. It should also be noted that, since there is a low relationship between actual behavior and behavior as perceived by the participants themselves, it is possible for behaviors to be related without having the relationship perceived. In the light of these

considerations, development of the instrument might well take the direction of including more stereotypes rather than of attempting to derive descriptions which actually do contain related behaviors. It would be desirable to explore what patterns are commonly perceived by participants in conferences. List of such functional patterns, with indices as to the incidence and importance of each, would provide a basis for revising the pattern descriptions in Questionnaire VB.

The questionnaire would be more versatile statistically if it permitted an evaluation of the extent to which or the adequacy with which a person performed a function or pattern of functions. This would provide a continuous measure for all participants with respect to each pattern.

The basic plan of the questionnaire seems sound and is probably best suited for a thorough experimental investigation of the relationship among functional patterns as perceived by the participants, the self perceived pattern and patterns aspired to, and the relationship of these and discrepancies between them to process and outcome variables.

2. Experimental findings

The kind of description obtained of the problem-solving or interpersonal behavior of a participant depends very much on the source of the description. The same behavior is perceived quite differently by the person himself, by his colleagues and by observers, although the reliability of each description is quite high. All of these descriptions differ from those based upon actual behavior.

The leadership style differences produced no statistically significant differences between sets of groups in their functional pattern characteristics as determined from participant classifications. The observers

perceived more persons in essentially leadership patterns in Groups 2 & 3 than in Groups 1 & 4. This same result is obtained with descriptions based on problem-solving behavior. The majority of the participants perceived themselves as either reality testers or idea men. Nor was there any difference between sets of groups in patterns to which the participants aspired. Almost all aspired to the problem-solving patterns of reality tester and idea men and the interpersonal patterns of supporter and social oiler. The leadership styles did produce differences in the number of persons who felt they had performed as they aspired to; fewer of the participants exposed to the negative style perceived a discrepancy between their pattern aspirations and their behavior.

There were very few significant relationships between patterns and interpersonal variables. The number of cases assigned each pattern was very small, and all the patterns were compared with other positive or neutral patterns, which may account for the lack of relationships. There were several relationships, however. The passive participants and isolates felt less accepted as members and were less highly regarded by their colleagues. Persons who were perceived as reality testers and idea men by their colleagues were more valued by their colleagues. The supporters and social oilers tended to perceive their groups as more unified than their colleagues. The persons who perceived themselves performing differently than the pattern to which they aspired perceived the group as being less unified. Congruence between colleagues' perception and the individual's perception of his behavior was unrelated to the interpersonal variables.

By and large, none of the positive patterns are significantly more related to satisfaction outcomes than are other patterns. A few

relationships were found, however. The persons who attempted to perform, or were perceived by observers or themselves as performing, the functional patterns of interrogator and goal reminder were less satisfied with group procedure. The persons least satisfied with the leader were those who felt they performed as idea men. The supporters, as perceived by their colleagues, were most satisfied with the group decision. The persons who failed, in their own opinion, to perform the interpersonal functions to which they aspired were less satisfied with group process and the group's decision than those who showed no discrepancy. There was no relationship between the participant's satisfaction with group procedure, leader performance and group decision and the number of persons whose perception of his behavior was the same as his.

It is apparent that all types of pattern designations, whether by the participant himself as his own perception or his aspiration or by colleagues and observers, are related to some interpersonal and outcome variables. It is impossible to say on the basis of these data which of the types of pattern designations is the most important determiner of lateral effects or outcomes, although there are more significant relations reported for patterns as assigned to the participant by his colleagues than for any other pattern designation method.

SUMMARY AND CONCLUSIONS

I. Experimental Design

Four groups of undergraduate students in a course in industrial psychology participated in an hour-long conference. The conference problem concerned the establishment of a remuneration policy for chain store managers. The groups were matched as to age, sex, proficiency in the problem area, previous group discussion experience and extent of familiarity among the members.

In two of the four groups the chairman was an active leader who attempted to increase understanding, to create an impression of group unity, increase the participant's feeling of being accepted as a member, promote favorable attitudes on the part of participants toward each other as persons and as members, and facilitate the problem-solving process. In the remaining groups this same leader's behavior was calculated to have negative effects on these variables.

Data were gathered by means of direct observation, questionnaires and analyses of the typewritten record of the conference. The quality of the individual and group solutions was determined by comparing them with a solution based upon the opinion of experts. The satisfaction of the participants with the group procedure, the leader, and the group decision, was measured by means of questionnaire items immediately after the conference and, again, after a delay of two months.

II. Theoretical Results

A. The Effects of Leadership Style on Process Variables

The leadership style differences produced no significant differences

between the two sets of groups on any of the interpersonal or communication variables. The problem-solving behavior of the two sets of groups was significantly different in a number of respects, most notable of which were a greater incidence of supporting contributions in the positive-style groups and a greater incidence of opposing contributions in the groups exposed to the negative style. There is little evidence that the groups reflected the leader behavior or that they altered their pattern of behavior to perform functions neglected by the leader.

B. The Relationships among Process Variables

The leadership style variation produced many differences between the two sets of groups in the manner in which process variables were related to each other. The differences warrant the following conclusions: Members who perform leadership functions in groups where the leader does not perform them are more acceptable participants to colleagues than those who do not perform them. In groups where the leader performs these functions in a manner satisfactory to the group, the participants performing them are less highly regarded by colleagues. The high participator is well accepted as a participant when he is responsible for functions neglected by the leader; when the leader performs these functions, the high participator is no more highly regarded than his less active colleagues. In a general atmosphere of supporting, opposing behavior is perceived as rejecting and makes the individual less acceptable to his colleagues. In a general atmosphere of opposing, this behavior lacks the meaning of rejecting and the opposers are highly regarded.

By and large, the interrelations among problem-solving, communication and interpersonal variables were low indicating that these three areas of process variables are quite independent of each other, although as pointed

out above, significant relationships do exist. These are largely limited to the problem-solving and interpersonal areas.

C. The Relationship of Leadership Style to Outcomes

The leadership style differences produced no differences between the two sets of groups in the quality of group and individual solutions. The only outcome related to leadership style variation was satisfaction with leader performance. The groups exposed to the positive leader were significantly more satisfied. This effect persisted after a two month period. The correlation between satisfaction with group process and satisfaction with decision is low but significantly different from zero. Satisfaction with group process and leader performance are unrelated.

The general absence of effect of the leadership style on outcomes is not due to the fact that the differences in leader behavior were slight. It rather suggests that a considerable range of leader behavior on interpersonal, problem-solving and communication variables is necessary before effects become evident.

D. The Relationship of Process Variables to Outcomes

The individuals who perceived their groups as unified, those who felt they were accepted, those who actually were accepted as persons and as participants were significantly more satisfied with the group's decision than their colleagues. Most of these relationships remained after a period of two months.

The problem-solving functions performed by the individual were, by and large, unrelated to his satisfactions. The persons who did relatively more supporting and summarizing were more satisfied with group decision

than their colleagues who performed these functions less frequently.

The extent to which the individual participated in the discussion was not related to his satisfaction with the group procedure, leader performance, or group decision.

The leadership style produced differences in the manner in which process variables in the two sets of groups were related to satisfaction outcomes. In the groups where the leader's performance was approved of, personal liking for the leader was positively related to decision satisfaction. In the groups which were dissatisfied with the leader, personal liking for the leader was negatively related to decision satisfaction. In the supporting atmosphere of the positive style, the amount of opposing was negatively related to decision satisfaction. In the opposing atmosphere, the more opposing the individual did, the greater was his satisfaction with the decision.

None of the process variables was significantly related to the quality of the participant's solution to the conference problem.

III. Methodological Findings

The study demonstrated that the participants' satisfaction with group decision, group procedure and leader performance can be measured with adequate reliability. Interpersonal variables such as the degree to which unity is perceived, the degree to which the person feels accepted, the degree to which the person is accepted both as a participant and as a person can also be reliably measured.

A system of categories was developed by means of which the problem-solving functions performed by the individual and by the group may be

reliably determined. This category system permits the determination of two types of scores: the relative proportion of the individual's contributions performing each function and the extent to which the individual was responsible for certain functions.

Finally, an attempt was made to obtain, by means of a questionnaire, descriptions of participants in terms of the pattern of problem-solving and interpersonal functions the participant was perceived by his colleagues as performing. The results indicate that reliable functional pattern or role designations can be made by naive participants. The questionnaire, with the refinements suggested, lends itself to an experimental study of the relationship among functional patterns as perceived by the participants, the self-perceived pattern and the pattern aspired to and the relationship of these variables and discrepancies among them to the satisfaction of participants.

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A P P E N D I X A

QUESTIONNAIRES PRESENTED BEFORE CONFERENCES

A P P E N D I X B

QUESTIONNAIRES PRESENTED IMMEDIATELY AFTER CONFERENCES

A P P E N D I X C

QUESTIONNAIRES PRESENTED TWO MONTHS AFTER CONFERENCES

APPENDIX D

I. Use of Local-Autonomy Criterion Solution Key

Instructions to Coders

1. A Feature which "may" be incorporated should be considered as a positive statement.
2. Where an individual proposes a straight salary for a short time, ignore this provision if he indicates a permanent plan to go into effect at the later date. Score under provisions of permanent plan.
3. Notes on particular items in scoring key (See Table 2).
 - Item 1: "Standard" salary accepted as base salary.
 - Item 3: If solution is in agreement for Items 4 or 5, then assume agreement for Item 3.
 - Item 6: Additional remuneration for overtime (Sundays and holidays) work not synonymous with bonus;

annual bonus based on length of service, etc., is to be considered a form of profit sharing (Item 13) and should not be considered as in agreement with Item 6.
 - Item 7: Record as in agreement as long as bonus is based on:
 - (a) store sales,
 - (b) net sales,
 - (c) sales over specific quota,
 - (d) sales,
 - (e) sales or profit, or
 - (f) increase in trade index.

Appendix D (continued-2)

II. Integrated Solutions for Four Experimental Groups

Group 1:

Store managers are to be paid a base salary greater than that of competing chains. A salary range is provided with increases awarded by the board of directors of the company. Besides the base salary a bonus based on a percentage of store net profits will be paid the respective store managers. Cost of living adjustments will also be made to the store managers.

Group 2:

Store managers are to be paid a base salary equal to that of competing chains. Besides this base salary, a bonus based on store sales and net profits will also be included in the store manager remuneration plan.

Group 3:

Store managers are to be paid a base salary equal to that of competing chains with a salary range provided with increases based on length of service. Concurrently with this basic salary a bonus based on store profits is to be paid the store managers. Other remuneration benefits provided are a retirement plan, hospital insurance, and a cost of living adjustment.

Group 4:

Store managers are to be paid a base salary equal to that of competing chains. At the same time, a salary range is provided with increases through length of service. A bonus based on percentage of store sales over a specific quota with this quota adjusted for store sales potential will also be paid. The bonus will be paid quarterly. Finally, a cost of living adjustment will be provided.

APPENDIX E

PROBLEM SOLVING CATEGORIES Coding Instructions

Goal Setting: These contributions have the function of establishing or suggesting goals or objectives, both procedural and content. They are concerned with ends to be attained. These objectives, goals, or ends may be those of the individual, which he is trying to have the group attain; they may consist of statements of accepted goals of the group or part of the group.

Illustrations:

Substantive - "We will want to attract experienced men."

Procedure - "We want to settle this question as quickly as possible."

Problem Proposals: These contributions serve the function of presenting a problem, either in content or procedure. These contributions are concerned with means to ends or goals.

Illustrations:

Substantive - A goal or objective has been stated or implied, such as, "We want experienced men." The problem proposal might be stated: "Shall we use a higher salary than our competitors or shall we give a higher incentive than our competitors?"

Procedure - "How can we keep this discussion from going on too long?"

Information Seeking: These contributions have the function of seeking to obtain information of an objective, factual, or technical nature. The information sought is from the area of fact on which the group decision is to be based or having bearing on the decision. The order should be guided by the function served as determined from the context and not the grammatical form of the contribution.

The content-procedure distinction should be kept in mind here. Technical information in the subject area of the discussion topic may be sought. Factual, objective, or technical information concerning the procedure of the group or an individual might be sought.

Illustrations:

Substantive - "What do our competitors pay?"

Procedure - "How much time do we have?"

"Are you disagreeing with Jones?"

Information Giving: These contributions have the function of providing objective, factual, or technical information, either in the subject area or with respect to procedure. The category would include the citing of examples or illustrations.

Procedural facts or information would be those which described procedure, either group or individual.

Illustrations:

Substantive - "It will cost 12,000 dollars to build a building."

Procedure - "I am trying to get Jones to state his ideas more clearly."

Solution Proposals: These contributions serve the function of indicating solutions to problems. They are suggested means to ends. These will also include modifications and additions to previous solution proposals. Even if the solution proposal has been presented before, it should be coded here, if the context gives it the solution proposal function.

Illustrations:

Substantive - "We could have a base salary plus a bonus based on sales."

Procedure - "Let's take the problems in order of difficulty."

***Development Seeking:** Contributions here serve the function of attempting to obtain clarification of previous contributions. They seek to determine what was intended by a previous contribution,

*These two categories have a tendency to become catch-all categories. While there are certain contributions which should be classified in one or the other and no other place, in other cases there may be a choice between another category and either of the above. When such a close decision occurs, it should be made in favor of another category than development seeking or giving.

It should be noted that we have selected certain types of developing contributions, using developing in the broad sense, for special classification. Thus, for example, the leader may use a problem proposal as a stimulating contribution. It is a particular kind of

what its implications are, what inferences are permissible. These frequently take the form of an inference stated as a question.

Also included here are contributions which facilitate the procedure of the group by asking the group as a whole or individuals to comment, indications to individuals that they have the floor, etc. These are primarily procedural development seeking, either mixed or pure. We have referred to them as stimulating.

Illustrations:

Substantive - "You feel we should have higher standards?"

Procedure - "Do any of you have any comments on that point?"

***Development Giving:** Contributions here elaborate, make explicit, enlarge on contributions. Included here are inferences from previous contributions. Also included here are self-repetitions or restatements by others of previous contributions. Also included here are reflecting types of contributions which are distillations of previous contributions without intent to get clarification. They are, rather, declarative statements of what the previous contributions stated or implied. Finally, this category includes contributions which provide the rationale, reasons, or arguments for the individual's position. They give his reasons for his saying what he does.

Illustrations:

Substantive - "That way we could get maximum returns on our investment."

Procedure - "By doing that we can make these decisions more quickly."

Opposing: These contributions are characterized by an opposition, resistance to, or disagreement with a suggestion, solution, interpretation, etc. Responses which point out obstacles, difficulties, or objections are included here.

stimulating statement, which we have chosen for separate classification as a problem proposal. It is this same type of categorizing that the coder is asked to do.

*See footnote above.

Illustrations:

Substantive - "I don't think we can afford to pay that much."

Procedure - "We can't take these problems up in order of difficulty."

Supporting: These contributions serve the function of indicating agreement or approval of a suggestion or solution proposal. Included here are indications of approval of the fact that another has contributed whether approval of content is present or not. This is a supporting comment in procedure.

Illustrations:

Substantive - "I agree that we must pay more than our competitors are paying."

Procedure - "Jones has an interesting proposal."

Summarizing Seeking: These contributions ask in effect for a summary, e.g., "I'm lost", "Where are we now?"

Illustrations:

Substantive - "Are we planning to have 48 men supervised by a board of directors?"

Procedure - "What have we decided?"

Summarizing Giving: These contributions summarize the group or part of the group's progress to date. To be classified here there must be reference to the group or part of the group and a span of time is implied which may extend into the present. Does not include summary statements of individual participations.

Illustrations:

Substantive - "So we will pay them a base salary, equal to our competitors and add a bonus based on sales."

Procedure - "We have been exploring the problem and examined several possible solutions."

Non-Problem Directed: This category includes irrelevancies of the tangential sort and a myriad of responses of an interpersonal sort, such as "Give me the ash tray", and "How about opening a window". It includes statements which have no reference to the subject matter of the conference nor to the group procedure.

APPENDIX F

RELIABILITY OF PATTERN CLASSIFICATIONS

In the classification of individuals into role descriptions by observers or other participants, the agreement of one half of the classifiers on a particular role for an individual has been considered a satisfactory criterion. The following theoretical considerations lead to an equation which is of use in evaluating the meaning of this criterion.

If p represents the probability that any given observer or participant classifies an individual into his "correct" role category, then $q/k-1$ may represent the probability that an observer/participant will classify the individual into one of the remaining "incorrect" role categories, with k being the number of role categories available, and $q = 1-p$. Using the same value ($q/k-1$) for all incorrect categories assumes that the misclassification is equally likely for all incorrect categories. If it is further assumed that all observers and participants are of equal ability in making the classifications, then the probability (P) that all classifiers will agree upon the same role for an individual may be represented by the equation,

$$P = p^n + \frac{q^n}{(k-1)^{n-1}} \quad (1)$$

where n is the number of classifiers involved.

When $k \geq 10$, the second term of this equation rapidly becomes insignificant for n 's greater than 3, as contrasted with the value of the first term. Hence, it may be neglected, and equation (1) becomes,

$$P = p^n \quad (2)$$

Using equation (2), it is easy to estimate the value of p for the criterion value of $P = .50$. Values of p for various values of n , with $P = .50$ are presented in the table below.

$$P = .50$$

n	p
3	.79
4	.84
9	.93
10	.93
11	.94
15	.96