The Effects of Individual-Team Training Versus Group-Team Training on Group Task Performance

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David W.

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The Effects of Individual-Team Training
Versus Group-Team Training
on Group Task Performance

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the Faculty of the Department of Psychology
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In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
David W. Rivkin
June 1986
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The Effects of Individual-Team Training Versus Group-Team Training on Group Task Performance

David W. Rivkin                June 1986                121 pages
Directed by: E.S. Erffmeyer, R. Miller, and J. O'Connor
Department of Psychology       Western Kentucky University

Organizations utilize groups frequently and extensively for problem solving and decision making. Research results indicate that training in group decision making improves the performance of groups on a variety of decision-making tasks (Erffmeyer & Lane, 1984; Hall & Williams, 1970; Nemiroff, Passmore, & Ford, 1976). Despite the heavy reliance of organizations on teams and the benefits of training in group decision making, there is a scarcity of research investigating the proper instructional mode (i.e., individual versus team) for group decision-making training (Denson, 1981; Goldstein, 1986). The results of studies investigating this problem have been inconclusive (Goldstein, 1986). Support has been found for both individual and team training (Denson, 1981).

Wagner, Hibbits, Rosenblatt, & Schulz (1977) suggested the notion that the proper of instructional mode for group training depends upon the type of situation in which the group is required to perform. For "established" situations which are well defined and highly structured, individual training is suggested. In "emergent" situations, which are
unstable and require large amounts of cooperation and communication between team members, team training is recommended.

The present study compared individual, team, and no training on a group decision-making task. Team performance in an emergent situation was compared in terms of the quality of the decision made, time spent on task, acceptance of the decision, and satisfaction with group process and training. The results indicated that team-trained groups produced the highest quality decisions, followed by individually-trained groups, then no-trained groups. Team training was perceived as the most satisfying, followed by individual training, with no training being perceived as the least satisfying. Groups did not significantly differ on acceptance, time spent on task, or satisfaction with group process.

The results of the present study help clarify previous research investigating group training. The present findings suggest that team training is the most appropriate instructional mode for groups working in emergent situations. Additionally, the findings suggest that workers will be more satisfied with team training than with individual training. Further research investigating the appropriateness of individual and team training in a variety of situations needs to be conducted to lend support to the present findings.
CHAPTER I

Introduction

The use of teams in industry is commonplace. Organizations have found it necessary to utilize teams in order to remain competitive in today's highly complex, diversified business world. However, the use of teams in industry is not without problems. Several researchers have identified process problems faced by work groups in industry. Process problems are those behaviors exhibited by group members that interfere with group interaction (Gustafson, Shulka, Delbecq and Walster, 1973; Van de Ven and Delbecq, 1974).

Despite the heavy reliance of companies on teams and the identification of problems faced by these teams, little research has addressed the development of training programs designed to improve the operating potential of groups. The majority of the research that has investigated work-group training has been conducted by the U. S. Navy (Denson, 1981). This research indicated that the proper instructional mode for team training is the individual training of team members. Although this research has some implications for groups involved in decision-making tasks in industry, the tasks used in the Navy research were highly structured and stable while the majority of tasks faced by teams in industry are less structured and require considerable cooperation and communication among team
These less structured, undefined situations are referred to as "emergent" situations while the more structured tasks examined in the Navy research are referred to as "established" situations.

The purpose of the present research was to investigate the proper instructional mode for training groups that will be working on emergent tasks. Specifically, individual-team training was compared with group-team training for improving group decision making. Because group training would allow team members to learn how to work effectively in a group, it was hypothesized that group training would improve the decision making ability of teams to a greater degree than would individual training. Individual training would not provide the same opportunity for group interaction.

In the following sections of this paper, the previous research investigating team training is reviewed, the rationale for the present investigation is explained, and the methodology utilized is described.
CHAPTER II

Review of the Literature

Significance of Teamwork

Members of organizations frequently work together in teams. In general terms, a team can be defined as a group of individuals working together to achieve a common goal (Blum & Naylor, 1968). In today's highly complex, technically advanced business world, organizations must utilize teams (e.g., work groups, committees) to effectively solve the problems they regularly face. Individuals alone simply do not possess the resources necessary to deal with many complex business problems (Bass & Ryterband, 1978). The team usually operates in a formal structure dictated by the organization. There are limits set on the types of problems the team must deal with and how the team is expected to operate in solving these problems. This structure helps to clarify the function of the team and the roles of each team member (Briggs & Naylor, 1964).

The widespread use of teamwork in organizations was indicated over two decades ago by a subscriber survey conducted by the Harvard Business Review (HBR, 1960). Eighty-one percent of the executives responding to the survey reported the presence of regular or standing committees in their companies. The survey revealed that 50% of lower-middle management, 76% of upper-middle management, and 81% of top management served on at least one committee.
In fact, the results of the HBR survey indicated that the average manager was a member of at least two committees and that he/she spent an average of 20% of their work week in informal consultation and conferences (Tillman, 1960). The HBR survey clearly indicated the extensive use of committees in the business sector. Research by Hall, Mouton, & Blake (1963) supports the usefulness of teams in industry. They found that the use of decision-making groups improved decision quality. Subjects predicted both individually and as a group the behavior of certain characters depicted in the film "The Twelve Angry Men." Hall et al. reported that under conditions requiring complex judgments, group decisions were superior when compared to the average of individual contributions. Additionally, the researchers noted that when members of a group interact, the group decision is closer to the best individual judgment rather than the worst.

Despite the fact that research supports the use of group decision making, it is not without its troubles. Problems that hinder team performance, termed process problems, have been identified by several researchers. Tillman (1960) noted that even though a majority of executives who responded to the HBR survey believed that committees were the best way to ensure high quality decisions, many felt that there was room for improvement in the way their committees operated. A majority of respondents noted that the groups in which they participated
wasted too much time.

The most common type of decision-making group in industry, the interacting group, is particularly susceptible to process problems. Interacting groups are characterized by completely unstructured discussion among group members. While observing interacting groups, several researchers have identified group member behaviors that interfere with the decision making process (Gustafson, Shulka, Delbecq and Walster, 1973; Van de Ven, and Delbequ, 1974). These observations may be summarized as follows:

1. Time and effort is wasted maintaining social-emotional relationships, thereby detracting attention from task instrumental roles.

2. Decisions are made before the problem is carefully analyzed and all possible solutions considered, thereby increasing the possibility of a lower quality decision.

3. Members reinforce conforming behavior, thus they avoid exploring conflicting views that might lead to a higher quality decision.

4. The search for solutions is often reactive which results in a short term focus on the actual problem, tendencies toward task avoidance, and increased time spent on social relationships.

5. Individuals with strong expressive personalities tend to dominate group discussion, which results in the non-participation of group members with
potentially important information to contribute.

6. Group members participate in solving the problem only to the extent that they feel equal in status and competence to other group members. They are not willing to contribute ideas that may meet with disagreement from more powerful group members. This can result in a low quality decision.

7. Participants may be operating by a "hidden agenda" which influences their decisions in that they are more concerned with their own success than with the success of the group.

8. Group members do not have time to think through ideas independently and thoroughly, resulting in low quality solutions, expressed in generalities.

9. Due to the problems listed above, group participants often perceive a high lack of closure, low self accomplishment, and low interest in future phases of problem solving following the end of the meeting.

A number of group decision-making techniques have been developed to alleviate the process problems faced by interacting groups. These include the Consensus Group Technique (Maier, 1967), the Nominal Group Technique (NGT) (Van de Ven & Delbecq, 1971), and the Delphi Technique (Dalkey & Helmer, 1963). Group members following the consensus model are required to follow a set of guidelines designed to promote conflict resolving behaviors. In order
for a decision to be accepted by a consensus group it must be accepted by every group member. The NGT is a more structured approach than the consensus model. Groups utilizing the NGT must follow a specific sequence of steps that ensures the participation of each group member. In the third type of decision-making technique, the Delphi Technique, group members are asked to respond to a series of questionnaires regarding a particular problem. Following the completion of each questionnaire, individual group members receive controlled feedback from the other group members. The response/feedback cycle is completed when a consensus is approached or when sufficient information has been collected.

Research comparing the decisions made by groups utilizing any one of these three techniques indicates that the decisions arrived at were of a higher quality than those made by interacting groups (Hall & Watson, 1970; Nemiroff, Pasamore, & Ford, 1976; Stephenson, Michaelson, & Franklin, 1982; White, Dittrick, & Lang, 1980). Additionally, research has indicated that the consensus method, which facilitates open exploration and resolution of conflict, leads to higher levels of decision acceptance compared to the other decision-making formats (Erffmeyer & Lane, 1984).

The evidence clearly indicates that decision-making techniques can be used to improve the quality of decisions made by groups. However, despite the widespread use of teams in industry and the identification of a number of
process problems that inhibit team performance, there is a limited amount of research regarding the proper instructional mode for teaching the techniques for improving team performance (Goldstein, 1974, 1986; Wagner, Hibbits, Rosenblatt & Schulz, 1977). Thus, the question remains, in order to ensure high quality team performance, should teams be trained in their respective work groups or should team members be trained individually?

The majority of the early research investigating this question has been conducted by the military. As weaponry became more advanced and required the use of teams to work effectively, the military recognized the importance of effective team work. Thus, they began the task of determining the most appropriate way to train individuals to work in teams. Industry gradually began to realize the importance of group decision making to its success. There have been a limited number of investigations of group decision-making performance. The following section reviews the military research investigating this problem as well as industry's attempts to improve group decision-making techniques.

Military Training

For over 15 years, the armed services have investigated team training (Denson, 1981; Glanzer, 1965). However, the results of this research have not provided a definitive answer to the question of whether individuals functioning in a team setting require unique skills that can only be
developed in a team context (Hall & Rizzo, 1975). What follows is a review of the team training studies conducted by the military. First, early military research investigations looking at the effectiveness of team versus individual training for group decision making is reviewed. Secondly, later research that examines the effects of the environment on the type of instructional mode utilized in training programs is reviewed.

The majority of the research investigating group versus individual training has been conducted by the military. Although this research has been concerned primarily with U.S. Navy Tactical teams whose function and purpose are more structured and specific than those teams found in organizations, this research has implications for team training in industry. The major portion of the early military research indicates that the most appropriate instructional mode for teams required to perform highly structured, specific, stable tasks is individual training of team members. The results of that research suggests that training should emphasize the individual proficiency of team members in terms of skill acquisition required to successfully complete the task faced by the group. The results also indicate that the coordinative skills necessary for effective team functioning will develop naturally as a result of high levels of individual proficiency (Glanzer, 1965; Hall & Rizzo, 1975; Klaus & Glaser, 1960).

Although there is limited empirical support from
military research for this notion, it has been suggested that when groups are faced with more ambiguous problems that require a high degree of cooperation and communication among participants, training in groups is the most appropriate instructional mode (Denson, 1981). Training in groups provides instruction in coordinative, interactive skills that facilitate team awareness, verbal communication among group members, and error analysis of both individual and team performance (Blum & Naylor, 1968; Denson, 1981; Wagner et al., 1977).

In the first of a series of studies investigating team training in the Navy, Horrocks, Krug, and Heerman (1960, 1961) hypothesized that if group training promoted interpersonal, coordinative skills, a team whose membership was changed should perform less well than a team whose membership remained intact. Horrocks et al. (1960) found that when a member of an intact team was replaced by another equally competent person (i.e. a person with the appropriate skill level), there was no detriment in team performance on a decoding task. Additionally, they found that emphasizing team coordination early in training interfered with the acquisition of individual task competence. The authors concluded that a generalized team skill was not operating in the situation and that group training, therefore, was not necessary for successful team performances.

Support for individual training for military teams was found by Klaus and Glaser (1955; 1960) and by Glanzer
(1965). Klaus and Glaser found that only the individual proficiency levels of team members at the start of team training determined team performance at the end of training. Glanzer, in discussing a series of studies on Navy tactical team training, concluded that team training was ineffective in improving individual trainee performance. However, he also noted that the critical stimuli for individual tasks were very difficult to isolate in a team context. Thus, although individual skill training should be emphasized, training team members in coordinative skills was still necessary.

Later research conducted by the military contradicted the earlier studies in that the military found support for training team members in groups (Egerman, Klaus, & Glaser, 1962; Glaser, Klaus, & Egerman, 1962; Johnston, 1966). Johnston (1966) working with teams involved in a radar tracking task, reported that group training was more effective than individual training when the criterion task required the exchange of information (i.e., verbal communication, interaction) between team members. In such cooperative situations, training that involved teaching coordination skills was necessary for effective team performance (McRae, 1966). Glaser et al. and Egerman et al. reported that training team members individually led to severe performance decrements in a team situation as compared to the performance of teams who participated in team training. These studies further indicated that the
addition of new individually trained members led to a decrement in team performance in groups that had received group training. These results directly contradict the findings of Horrocks et al. (1960; 1961), who reported that replacement of team members from intact work groups did not significantly affect team performance.

Other results regarding group versus individual training were reported by Hall and Rizzo (1975). In their assessment of U. S. Navy tactical team training, the authors concluded that too much emphasis had been placed on group training rather than on the training of highly competent team members. These researchers suggested that less time should be spent training group members coordinative, interactive skills. Rather, training should emphasize the individual concrete task skills that each team member must acquire to perform effectively. Hall and Rizzo suggested that a high level of team performance "naturally emerges" as a result of high levels of individual performance. Thus, these researchers concluded that the emphasis in Navy tactical team training should be shifted away from the team and towards the individual.

The results of the early military research regarding the proper instructional mode were conflicting; support was found for both individual and team training of groups. Meister (1976) attempted to clarify this situation by examining the type of tasks for which the team was being trained as a moderating variable in determining the proper
instructional mode for team training. In a review of the team training literature, Meister (1976) found that individual training was superior to team training for simple to moderately complex tasks. The author noted that "group training appeared to be relatively ineffective in producing performance beyond that resulting from individual operator training" (p. 123). Citing research by Horrocks et al. (1960, 1961) and Briggs and Johnson (1967) Meister (1976) reported no significant difference between individually trained and group trained teams.

Training for Emergent versus Established Situations

The notion that the type of task has a major influence on the selection of the instructional mode utilized in group training was investigated further by Wagner, Hibbits, Rosenblett & Schulz (1977). They suggested that the amount of coordination and cooperation necessary among team members to successfully complete a task determines the type of training (i.e. individual versus team) that is appropriate. In their review of U.S. Navy tactical team training, Wagner et al. (1977) made a distinction between ESTABLISHED and EMERGENT situations. Utilizing Boguslaw and Porters' (1967) definition, Wagner et al. define these situations as follows:

An ESTABLISHED situation is one in which: (1) all action-relevant environmental conditions are specifiable and predictable, (2) all action-relevant states of the system are specifiable and predictable, and (3) all available research technology or records are adequate to provide statements about the probable
consequences of alternative actions. An EMERGENT situation is one in which: (1) all action-relevant environmental conditions have not been specified, (2) the state of the system does not correspond to relied upon predictions, and (3) analytic solutions are not available, given the current state of analytic technology (p. 234).

Wagner et al. (1977) noted that studies in which individual training was found to be as effective as or superior to team training used "established" situations (Briggs & Johnston, 1967; Glanzer, 1965; Horrocks et al., 1960). Other studies involving "emergent" situations, found team training to be more effective than individual training when the criterion task required high levels of communication and coordination between team members (Egerman, Klaus, & Glazer, 1962; Glaser, Klaus, & Egerman, 1962; Johnston, 1966). In such emergent situations, training that emphasized coordination skills was necessary for effective team performance (McRae, 1966). Thus, Wagner et al. concluded that in more emergent contexts where interactive skills are important, group training is vital to the effective completion of the task.

This review (Wagner et al., 1977) of the relationship between the type of situation in which group members are expected to perform and the type of instructional mode selected provides direction for the generalizability of findings from military research to training that occurs in industry.

Training in Industry

The Wagner et al. (1977) conclusions are applicable to
training programs designed to improve the decision-making abilities of employees in a business setting. Typically, committees are asked to solve problems in very unstable, emergent situations. Several investigators have looked at the effects of team training for groups involved in decision making in a business setting (e.g., Hall & Watson, 1970; Hall & Williams, 1970). These studies are reviewed in order to evaluate the effectiveness of individual versus team training for groups required to perform in more emergent situations.

Studies by Hall and Williams (1970) and Hall and Watson (1970) indicated that team training is effective in improving group decision making in emergent situations. Hall and Williams noted that groups operate with a sense of urgency when faced with a problem. Group members tend to value early resolution achieved with as little conflict as possible. To help improve the decision-making ability of a group, Hall and Williams utilized the instrumental team training technique developed by Blake and Mouton (1962). The authors reported that trained groups consistently performed better on measures of decision quality, utilization of resources and creativity when compared to untrained groups.

Hall and Watson (1970) employed consensus training to improve employee group decision making on a simulated business decision. They reported findings similar to Hall and Williams (1970), that is, groups using consensus
principles produced higher quality decisions and utilized available resources to a greater extent than did uninstructed groups. This research indicates that team training is successful for improving team decision-making ability in emergent situations.

Another training technique utilized by researchers and practitioners to improve group decision making is team building. Team building "is any planned event with a group of people with common organizational relationships and/or goals that is designed to improve the way the group accomplishes its task and at the same time enhances the resources of the group" (Huse, 1980). Following team building, groups typically are presented with an emergent problem situation (DeMuse & Liebowitz, 1981; Friedlander, 1967; Hughes, Rosenback & Clover, 1983). The majority of the recent literature reports a positive increase in group functioning in these situations following a team building program (DeMuse & Liebowitz, 1981).

Research conducted in both industrial settings and military settings have reported increased performance by work groups following a team building intervention (Friedlander, 1967; Hughes, Rosenback & Clover, 1983). In an experimental study assessing the effects of team building on 12 ongoing workgroups in an industrial setting, Friedlander noted three significant changes in work group performance: increased mutual influence among team members, increased involvement and participation of group members,
and increased problem solving effectiveness. In a more recent team building intervention involving U.S. Air Force Squadrons, Hughes et al. (1983) reported a significant increase in academic performance, training performance, and parade formation performance. Additionally, responses by squadrons to a questionnaire indicated that squadron members had a high regard for the training program.

In summary, the results of Hall and Watson (1970), Hall and Williams (1970), as well as the results of the team building research (DeMuse & Liebowitz, 1981; Friedlander, 1967; Hughes et al., 1983), indicate that team training is effective in improving group decision-making ability in certain situations (i.e., emergent).

Very little research other than the studies conducted in the military has been directed toward the relative efficacy of individual versus group training for emergent situations. The results of the military research are mixed. Several researchers have indicated that group training should emphasize instruction in individual member task skill acquisition (Briggs & Johnston, 1967; Glanzer, 1965; Horrocks, Krug, and Heerman, 1960, 1961; Klaus & Glaser, 1955, 1960). Other researchers suggest that a high level of team performance "naturally emerges" as a result of high levels of individual performance (Hall & Rizzo, 1975). Yet, several studies conducted on Navy tactical teams suggest that team training should emphasize coordinative, interactive skills that improve the way team members work

Wagner, Hibbits, Rosenblatt, & Schulz (1977) suggest that the inconsistent results are due to the failure to consider the different types of situations in which the teams were involved. Wagner et al. indicate that teams involved in well structured, "established" situations may not need special team training. However, those teams expected to perform in unstable, unstructured, "emergent" contexts do require specific training in team functioning. The present study provided an empirical basis to address the effectiveness of individual and group training for group decision making in an emergent situation.
CHAPTER III

The Present Study

The present study utilized a decision-making task that required team members to work under very unstable, unstructured conditions. Groups were presented with a problem and relevant information and were required to make a decision regarding the appropriate course of action. In order to make a high quality decision, group members needed to use the coordinative, interactive skills they had acquired during group training.

Wagner et al. (1977) stated that individuals should be trained in the groups in which they will be working when the group is involved in emergent situations. Team training provides individuals with an opportunity to learn about and improve the group process that takes place in a team setting while individual training does not. It was hypothesized that teams trained in groups would perform better on the decision-making task than those teams whose members were trained individually or received no training. That is, they would come to a higher quality decision, achieve a higher level of acceptance, and spend more time on the decision-making task. These dependent variables are discussed more fully in the following section. Additionally, it was hypothesized that those subjects who participated in the individual training sessions would perform better on the dependent measures than subjects in
the no training condition, since individual training does provide some guidance for the group on how to solve the task as a team.
CHAPTER IV

Method

Subjects

Students enrolled in undergraduate psychology courses served as subjects. Subjects were randomly assigned to one of three conditions: group training, individual training, or no training. Each condition consisted of 15 groups, with 4 to 5 subjects per group. A total of 202 subjects participated in the study, with 63 subjects in group training, 70 subjects in individual training, and 69 subjects in no training. In order to control for the potential effects of friendship, an effort was made to use groups of subjects who were not well acquainted with one another. Additionally, to control for the potential effects of sex of subjects, all groups contained both male and female participants.

Training

In the following section an overview of the group training, individual training, and no training programs is given. A more detailed description of these training programs may be found in appendices C, D, and E, respectively.

Training Task. The NASA Moon Survival Problem (see Appendix A) was the decision-making task utilized in the training programs (Hall, 1963). This task describes a situation in which a space crew, due to mechanical
difficulties, has crash-landed on the moon some 200 miles away from their designated landing site where another ship is waiting for them. Subjects are instructed to think of themselves as crew members. They are told that a) all equipment, except for 15 items, has been damaged in the crash; b) in order to survive, the crew must make a 200 mile journey to the other ship; c) the remaining 15 items of equipment must be evaluated with regard to their utility and importance in assisting the crew in making the trip. Subjects are to rankorder the 15 items in terms of their importance in assisting the crew in reaching the other ship.

A correct answer to the NASA moon survival problem has been provided by the Crew Equipment Research Section of the NASA Manned Spacecraft Center of Houston, Texas. Performance on the task can be evaluated against this correct answer. The task has been found to generate high levels of ego-involvement by subjects. Additionally, the decision-making performance of subjects is influenced by how well group members communicate information to one another. Thus, the NASA moon survival problem is analogous to commonly encountered multistage, decision-making situations (Hall and Watson, 1970).

**Group Training.** Individuals were randomly assigned to five member groups. Each group was given a brief introduction into the dynamics of consensus group decision making (Hall and Watson, 1970). Following the introduction,
subjects were group trained in group process. In group training, subjects seated around a table were read introductory material concerning the importance of group decision making. Subjects then participated in a discussion, led by the trainer, in which they learned about process problems that occur in groups and how these problems can be alleviated with consensus decision making. Appendix B contains the guidelines for consensus decision making. Subjects then had a chance to solve the NASA task first individually and then as a group following the consensus guidelines. Appendix C contains a detailed description of group training.

Hall and Watson (1970) developed the consensus guidelines to help counteract group behaviors identified by Hall and Williams (1970) that hindered group decision-making performance. These behaviors include 1) autocratic leadership styles, 2) inflexible patterns of communication where disagreements are not tolerated, 3) a competitive "win-lose" approach to problem solving, 4) inability to share information openly and candidly, and 5) unequal sharing of responsibility by group members in to solving the group task. The guidelines have been found to encourage certain group behaviors which are helpful in improving the decision-making performance of groups (Hall and Watson, 1970).

Following the completion of the NASA task using the consensus guidelines, groups were asked to evaluate the
group process that occurred. They were asked to discuss their own performance in the group as well as the group performance. Topic areas covered during this discussion phase included problems that the group faced in reaching a consensus decision and ways to improve the group process.

**Individual Training.** Individual training consisted of training individuals in groups of 4 to 5 people, who were assigned to teams in a later phase of the study. A lecture format was used to train subjects. The lecture material consisted of the same information that was given to subjects participating in the Team Training group (i.e., the importance of group decisions, problems faced by groups, the consensus guidelines, the NASA task, and a discussion of group process). However, the information was presented as a lecture rather than as instructions for a group exercise, as it was presented in the team training group (see Appendix D). Following the lecture, subjects were instructed to complete the NASA task individually. Upon completion of the problem, participants were asked to discuss the type of problems that might have occurred if they had been asked to solve this problem as a group and how the consensus method might have alleviated some of the process problems identified.

**No Training.** In the No Training Condition groups of four to five subjects were read a brief introduction to familiarize them with the topic of group decision making. Following the introduction subjects were given the NASA task
ranking form as an example of a group decision-making task. The subjects were asked to solve the problem individually. Following the completion of the task, a lecture explaining the benefits of group decision making as opposed to individual decision making was given. Subjects were told that research has found that groups that have solved the task have made superior decisions compared to individuals who have attempted to solve the task. Appendix E contains a detailed description of the No Training Condition.

Implementation

In the following section an overview of the implementation phases for group trained, individually trained, and untrained subjects is given. A more detailed description of these implementation phases can be found in appendices G, H, and I, respectively.

Group Assignment. One to two days following training, all subjects participated in another decision-making task. All subjects solved the decision-making task in four- or five-member teams. Those subjects who were involved in group training solved the problem in the same groups in which they were trained. Those subjects who participated in the individual training program were randomly assigned to four- or five-member groups consisting of other individually trained subjects. Subjects who received no training were also randomly assigned to four- or five-member groups to solve the task. All groups were composed of both male and female participants.
Implementation Task. Participants were asked to solve the Zin Obelisk problem (Francis and Young, 1979) (see Appendix F), a problem-solving task with very little structure. In the Zin Obelisk exercise, participants are asked to determine the day of the week the Zin was completed and how many working days it took to complete. Thirty-three individual pieces of information pertaining to the problem are randomly distributed among group members. Groups are instructed that they are only allowed to share information orally; they are not allowed to pass the information cards to one another. Like the NASA task, there is a correct answer to the problem. Subjects who participated in either the group training or individual training programs were instructed to implement the skills they acquired from the training in group process and consensus decision making. Appendix G and Appendix H contain a detailed description of the implementation phase for the group trained and individually trained subjects, respectively. Subjects in the no training condition were instructed to solve the task as a group to the best of their ability. Appendix I contains a description of the implementation phase for subjects in the No Training condition. Each group was provided with a calculator to use in solving the task.

Dependent Measures

Several measures were taken to compare the effectiveness of group decision-making training on performance. Group decisions were compared in terms of the
quality of the solution, acceptance of the group decision, and the time it took to reach the group decision. Additionally, a questionnaire was administered measuring subjects overall satisfaction with their group's decision-making process and the decision making training they received.

Quality. Several studies have indicated that groups instructed in decision-making techniques reach higher quality decisions than uninstructed groups (Hall & Watson, 1970; Hall & Williams, 1970; Hall & Williams, 1966). These researchers suggest that instructed groups learn to utilize their resources more effectively and overcome process problems that frequently inhibit group performance (Breinholt & Webber, 1972; Hall, 1971; Maier, 1967). In the present investigation the quality of the decision made by each group is reflective of the effectiveness of training. The quality measure was determined by comparing the group's solution of the day the Zin was completed to the correct solution (See Appendix F).

Acceptance. Maier (1967) noted that in order for a solution to be effective, the decision must be accepted by the individuals who must implement it. Research evidence generally supports the notion that people better accept decisions they have participated in making (DeMuse & Liebowitz, 1981; Friedlander, 1967; Jewell & Reitz, 1981). Individual acceptance of the group decision regarding the day the Zin was completed was operationalized by the
agreement between the group's decision and each individual's decision. Following the group's decision, each subject was asked to record the day he/she believed the Zin was completed, as well as how many working days were required for its completion. This measure reflected individual acceptance of the group's decision.

**Time.** Research indicates that although training in group decision making minimizes process problems, it usually results in groups taking a longer period of time to reach a solution due to the greater use of individual member resources (Hampton, Summer & Webber, 1982). The time period extended from the point at which each group began the decision-making task until the task was completed, recorded, and analyzed to determine if it varied as a function of training.

**Additional Measures.** Subjects were asked to complete a questionnaire to determine their satisfaction with the overall group-decision making experience. This questionnaire contains questions which are intended to evaluate the effectiveness of the group process that occurred in each group. Additionally, subjects were asked to answer a question related to their satisfaction with the decision making training they received. Appendix J contains the questionnaire.
CHAPTER V

Results

Performance Measures

Quality. Chi square was used to analyze the effects of instructional mode on the quality of decisions reached by groups. A correct solution was coded as "1" while an incorrect solution was coded as "0." The analysis indicated that the quality of the decisions was significantly different between groups, \( X^2 (2, N = 45) = 6.66, p < .05 \). Eighty percent of the groups in the team-training condition reached the correct decision; 53% of the groups in individual training reached the correct decision; and 30% of the groups in the no-training condition reached the correct decision.

Acceptance. Chi square analysis was used to assess the effects of instructional mode on the acceptance of the group decision by individual team members. Agreement with the group decision was coded as "1" while any other solution was coded as "0." This analysis indicated no significant difference between groups, \( X^2 (2, N = 201) = 2.63, p > .05 \). Ninety-six percent of subjects in the team-training condition, 90% of subjects in individual training, and 94% of subjects in the no-training condition accepted their group's final decision.

Time. An analysis of variance on the dependent variable time on task indicated no significant difference
between training conditions, \( F(2, 14) = .26, p > .05 \) (see Table 1). The means and standard deviations for each instructional mode for time (expressed in minutes on task) may be found in Table 2. Individually-trained groups spent the longest time on task (\( M = 36.27 \) min.), followed by team-trained groups (\( M = 28.53 \) min), with no-trained groups spending the shortest time on task (\( M = 25.60 \)).

**Reaction Measures**

Individual questionnaire items were analyzed using Analyses of Variance. These results indicated no significant differences between groups on the first seven items which addressed issues regarding the quality of the group process that occurred (\( p > .05 \)). The overall means and standard deviations and the means and standard deviations for each training condition for these items may be found in Table 3. In general, the results indicated that subjects were "moderately" to "mostly" satisfied with the group process that occurred in their groups.

On item number eight, which assessed subjects' satisfaction with training, a significant difference between training conditions was found, \( F(2, 201) = 59.46, p < .0001 \) (see Table 4). Duncan's Multiple Range Test indicated a significant difference between all three conditions of training with team training being perceived as the most
Table 1

Summary Table for the Analysis of Variance of Time Spent on Task

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Training Groups</td>
<td>2</td>
<td>142.76</td>
<td>1.39</td>
</tr>
<tr>
<td>Groups within Training</td>
<td>3</td>
<td>186.32</td>
<td>1.82</td>
</tr>
<tr>
<td>Error</td>
<td>39</td>
<td>102.44</td>
<td></td>
</tr>
</tbody>
</table>


Table 2
Means and Standard Deviations for Time Spent on Task (in Minutes)

<table>
<thead>
<tr>
<th>Type of Training</th>
<th>M</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Training</td>
<td>28.53</td>
<td>8.28</td>
</tr>
<tr>
<td>Individual Training</td>
<td>36.27</td>
<td>11.94</td>
</tr>
<tr>
<td>No Training</td>
<td>25.60</td>
<td>10.69</td>
</tr>
</tbody>
</table>
Table 3

Mean Responses to Questionnaire Items

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>Overall Mean*</th>
<th>Condition Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Freedom to participate</td>
<td>4.42</td>
<td>4.36</td>
<td>.87</td>
</tr>
<tr>
<td>Group Training**</td>
<td>4.36</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>4.48</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>4.39</td>
<td>.91</td>
<td></td>
</tr>
<tr>
<td>2. Time was well spent</td>
<td>3.85</td>
<td>3.98</td>
<td>.91</td>
</tr>
<tr>
<td>Group Training**</td>
<td>3.98</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>3.84</td>
<td>.91</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>3.73</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td>3. Satisfaction with the quality of ideas</td>
<td>4.21</td>
<td>4.19</td>
<td>.77</td>
</tr>
<tr>
<td>Group Training**</td>
<td>4.19</td>
<td>.75</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>4.30</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>4.14</td>
<td>.75</td>
<td></td>
</tr>
<tr>
<td>4. Satisfaction with the quantity of ideas</td>
<td>4.14</td>
<td>4.12</td>
<td>.86</td>
</tr>
<tr>
<td>Group Training**</td>
<td>4.12</td>
<td>.81</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>4.28</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>4.01</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td>5. Effectiveness of method to evaluate ideas</td>
<td>3.90</td>
<td>4.07</td>
<td>.89</td>
</tr>
<tr>
<td>Group Training**</td>
<td>4.07</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>3.85</td>
<td>.95</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>3.76</td>
<td>.89</td>
<td></td>
</tr>
<tr>
<td>6. Effectiveness of method to generate ideas</td>
<td>3.97</td>
<td>3.98</td>
<td>.81</td>
</tr>
<tr>
<td>Group Training**</td>
<td>3.98</td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>4.10</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>3.81</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td>7. Effectiveness of method to deal with the problem</td>
<td>4.22</td>
<td>4.22</td>
<td>.92</td>
</tr>
<tr>
<td>Group Training**</td>
<td>4.22</td>
<td>.81</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>4.32</td>
<td>.92</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>4.10</td>
<td>.98</td>
<td></td>
</tr>
<tr>
<td>8. Satisfaction with training</td>
<td>3.20</td>
<td>4.14</td>
<td>1.35</td>
</tr>
<tr>
<td>Group Training**</td>
<td></td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td>Individual Training***</td>
<td>3.18</td>
<td>1.19</td>
<td></td>
</tr>
<tr>
<td>No Training****</td>
<td>2.34</td>
<td>1.30</td>
<td></td>
</tr>
</tbody>
</table>

* N=202, ** N=63, *** N=70, **** N=69
Table 4

Summary Table for the Analysis of Variance of Satisfaction with Training

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects between Training</td>
<td>2</td>
<td>51.50</td>
<td>59.46*</td>
</tr>
<tr>
<td>Groups within Training</td>
<td>42</td>
<td>2.94</td>
<td>3.40*</td>
</tr>
<tr>
<td>Error</td>
<td>157</td>
<td>.87</td>
<td></td>
</tr>
</tbody>
</table>

*p<.0001
satisfying ($M = 4.14$), individual training falling in the middle ($M = 3.18$) and no training being perceived as the least satisfying ($M = 2.34$) (see Table 3).
CHAPTER VI

Discussion

The effectiveness of individual-team training, group-team training, and no training on group decision-making performance in an emergent situation was investigated in this study. Group performance was evaluated in terms of the quality of the solution, acceptance of the group decision, the time spent on task, and the reaction of group members to the group process that occurred.

Performance Measures

Quality. As expected, subjects who were group trained reached significantly higher quality decisions than either individually-trained or no-trained subjects. These results indicate that group-team training provided teams the opportunity to learn about and improve their group process. Although the exact nature of the improved group process cannot be delineated from the present research, there are several intuitive explanations suggested by the literature (Hall & Watson, 1970; Hall & Williams, 1970; Nemiroff & King, 1975; Wagner et al., 1977). Group training likely provided team members the chance to develop a sense of "teamness" (DeMuse & Liebowitz, 1981; Wagner et al., 1977). Team training allowed group members to increase the levels of communication and coordination between group members. This training provided teams the opportunity to analyze and think of ways to improve their group process (DeMuse &
Liebowitz, 1981; Hall & Williams, 1970). It also allowed the most team member participation. Individual training, although it did improve the quality of decisions made by groups over no training, did not provide teams with these same interactive opportunities. In individual training, group members were trained in a lecture style format. They were then asked to solve the Zin task in randomly composed groups. Thus, individual-trained groups did not have the opportunity to develop a sense of "teamness" prior to solving the Zin task.

The significantly higher quality solutions made by group-trained teams help to clarify previous research investigating team training. The results of the present study support the notion previously suggested by Wagner et al. (1977) that groups required to perform in emergent situations should be group trained. Other researchers suggested that high levels of team performance naturally emerge as the result of high levels of individual performance (Hall & Rizzo, 1975). However, the present study indicates that team training in an emergent situation is significantly more effective than individual training in improving the quality of decisions reached by groups.

Acceptance. Acceptance of the group's decision was also used to evaluate the effectiveness of the type of training received by subjects. Contrary to expectations, subjects in the three training conditions did not differ significantly in their acceptance levels. In fact, there
was almost universal acceptance by all subjects of their group's decision. This lack of variability in acceptance rates may have been caused by the experimental situation. The experimental situation did not foster the making of individual decisions. Subjects spent all of their effort reaching a group decision. The task they were asked to solve was sufficiently complicated that it required not only their complete attention, but their participation as well. Since each subject had specific information related to the task, he/she had to be extremely involved in the group process. Due to this situational constraint, subjects may have felt that they did not have the time to study the information to reach a separate individual decision. Thus, they did not have an individual decision to compare with the group's answer.

To obtain a more accurate acceptance measure, perhaps subjects should have been asked how confident they were in the group's decision. This measure would have indirectly indicated subject's acceptance of the group's answer without requiring them to reach a separate individual decision.

Time. The amount of time it took each group to reach a decision was also used to evaluate the effectiveness of training. Previous research had indicated that groups trained in consensus decision making spent more time reaching a group decision due to the greater use of individual member resources (Hampton, Summer & Webber, 1982, 1974). However, in the present study, groups did not differ
significantly in the amount of time they spent reaching a group decision. Thus, it would appear that team-trained groups utilized member resources in a more efficient manner than groups in the individual-training or no-training condition, since they reached higher quality decisions in the same amount of time.

**Reaction Measures**

A questionnaire measuring subjects' reactions to the group process was the final dependent variable used to evaluate success of training. Analysis of the responses to this questionnaire indicate that subjects who were team trained were the most satisfied with the training, followed by individually-trained subjects, then no-training subjects. These results indicate that subjects felt that training in consensus decision making positively influenced their group's ability to solve the Zin task. Additionally, team training which involved the most subject participation and allowed teams to analyze and consider ways to improve their group's process was the most satisfying form of training.

On the other seven questionnaire items, which addressed the group process that occurred during the decision-making task, no significant differences between groups were found. In general, subjects reported that they were "moderately" to "mostly" satisfied with their group experience in solving the Zin task. They felt their groups utilized time "mostly well," and that they were "mostly free to participate" in
their group's discussion. Additionally, subjects indicated they were "mostly satisfied" with the content of the information discussed in their groups. Finally, subjects believed that the method they used to solve the Zin problem was "mostly effective."

The lack of response differences between training conditions to the first seven items on the questionnaire may be explained in terms of the subject's lack of experience in group decision-making situations. All subjects had considerable previous experience participating in learning situations (e.g., high school courses, college courses, etc.). Thus, they could compare the current training to previous training experiences. However, the other measures on the questionnaire dealt with group process. The demographic characteristics (i.e., age, occupation, etc.) of the subjects suggest they generally lacked previous experience solving tasks in groups. Thus, it is possible they did not have a frame of reference to compare with their group experience. Perhaps, the questionnaire would have been a more valid measure if it had been administered to subjects with previous group decision-making experiences.

Conclusions

Results of the present study lend support to previous investigations on the generally beneficial effects of training in group decision making on the quality of the decisions made. In the present study, subjects who received training in consensus decision making reached significantly
higher quality decisions than subjects in the untrained group. These findings are in agreement with previous studies (Errfmeyer & Lane, 1984; Hall & Watson, 1970; Nemiroff & King, 1975; Nemiroff et al., 1976). Thus, the results of the present study confirm the notion that training in group decision making is beneficial for organizations that wish to significantly improve the quality of decisions made by groups.

The present investigation helps clarify and extend the results of previous studies regarding the proper instructional mode for decision-making training. The majority of research investigating this question had been conducted by the military (Denson, 1981). The results of this research were inconclusive (Goldstein, 1986; Wagner et al., 1977). Support was found for both individual training and team training of group members (Blum & Naylor, 1968; Denson, 1981; Glanzer, 1965; Hall & Rizzo, 1975; Klaus & Glaser, 1960; Wagner et al., 1977). Wagner et al. (1977) suggested that the type of situation faced by groups (i.e. emergent versus established) determined the type of training a team received. The results of the present study lend support to this notion. Team-trained groups in emergent situations reached significantly higher quality decisions than individually-trained teams performing in the same situation. Additionally, the present research suggests that individuals are more satisfied with team training than with individual training.
The findings of the present research have implications for the selection of the instructional mode to be used in group decision-making training. The results suggest that organizations must carefully analyze the type of situations in which their workers will be required to perform (i.e., established versus emergent) before determining the type of training they receive. Findings from the present study suggest that team training is the most appropriate instructional mode for groups expected to perform in emergent situations. Additionally, the findings suggest that workers will be more satisfied with team training than individual training.

To help lend support to the results of the present study, further research is needed investigating the appropriateness of individual and team training for group decision-making in a variety of situations. Different types of instructional modes need to be tried in both established and emergent situations. Additionally, future research employing actual managers required to perform in decision-making groups would extend the generalizability of the current findings.

Finally, further research needs to investigate the effects of member replacement in team-trained groups. Will subjects who are team trained and then randomly assigned to work with others who are similarly trained, perform as well as those trained in intact work groups?

In general, the results of the present investigation
suggest that group-team training is the most appropriate instructional mode for improving the quality of the decisions made by groups in emergent situations. Additionally, individuals were more satisfied with group-team training as compared to individual or no training. These results help clarify and expand on studies previously conducted on the effects of different types of team training on group performance. These results indicate the value of group-team training for organizations that wish to increase the quality of the decisions made by groups as well as keeping their workers satisfied.
Appendix A

NASA WORKSHEET

Instructions: You are a member of a space crew originally scheduled to rendezvous with a mother ship on the lighted surface of the moon. Due to mechanical difficulties, however, your ship was forced to land at a spot some 200 miles from the rendezvous point. During re-entry and landing, much of the equipment aboard was damaged and, since survival depends on reaching the mother ship, the most critical items available must be chosen for the 200 mile trip.

Below are listed the 15 items left intact and undamaged after landing. Your task is to rank order them in terms of their importance in allowing your crew to reach the rendezvous point. Place the number 1 by the most important item, the number 2 by the second most important, and the number 3 etc.,

Box of Matches
Food Concentrate
Parachute Silk
50 Feet of Nylon Rope
Portable Heating Unit
Two .45 Calibre Pistols
One Case Dehydrated Pet Milk
Two 100-lb. Tanks of Oxygen
Stellar Map (of the moon's constellation)
Life Raft
Magnetic Compass
5 Gallons of Water
Signal Flares
First Aid Kit Containing Injection Needles
Solar-Powered Fm Receiver-Transmitter
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Box of Matches</td>
<td>Useless since there is no oxygen on the moon to sustain a flame</td>
</tr>
<tr>
<td>4</td>
<td>Food Concentrate</td>
<td>Efficient means of supplying energy requirements.</td>
</tr>
<tr>
<td>6</td>
<td>Fifty Feet of Nylon Rope</td>
<td>Useful in scaling cliffs, tying injured together, etc.</td>
</tr>
<tr>
<td>8</td>
<td>Parachute Silk</td>
<td>Protection from sun's rays.</td>
</tr>
<tr>
<td>13</td>
<td>Portable heating unit</td>
<td>Only useful if on the dark side of the moon.</td>
</tr>
<tr>
<td>11</td>
<td>Two .45 calibre pistols</td>
<td>Possible source of self-propulsion.</td>
</tr>
<tr>
<td>12</td>
<td>One case dehydrated Pet Milk</td>
<td>Duplicates food concentrate in bulkier form.</td>
</tr>
<tr>
<td>1</td>
<td>Two 100-lb. tanks of oxygen</td>
<td>Most pressing survival need.</td>
</tr>
<tr>
<td>3</td>
<td>Stellar map (of the moons constellation)</td>
<td>Most important means of determining position and direction.</td>
</tr>
<tr>
<td>9</td>
<td>Life raft</td>
<td>CO2 bottle in military raft may be used for propulsion.</td>
</tr>
<tr>
<td>14</td>
<td>Magnetic compass</td>
<td>Virtually useless since magnetic field on the moon is not polarized.</td>
</tr>
<tr>
<td>2</td>
<td>5 Gallons of water</td>
<td>Absolute necessity to sustain life.</td>
</tr>
<tr>
<td>10</td>
<td>Signal Flares</td>
<td>Possible distress signal once close enough to mother ship to be seen.</td>
</tr>
<tr>
<td>7</td>
<td>First aid kit containing injection needles</td>
<td>Needles for vitamins, medicines etc., will fit special aperture in Nasa space suits.</td>
</tr>
<tr>
<td>5</td>
<td>Solar-powered Fm receiver-transmitter</td>
<td>For communication with mother ship; but Fm require line-of-sight transmission and short ranges.</td>
</tr>
</tbody>
</table>
Appendix B
Appendix B

Guidelines for a Consensus Group

Your group is to employ the method of group consensus in reaching its decision. This means that the ranking for each of the 15 survival items must be agreed upon by each group member before it becomes a part of the group decision. Consensus is difficult to reach. Therefore, not every ranking will meet with everyone's complete approval. Unanimity, that is a unanimous decision, is not a goal (although it may be achieved unintentionally), and it is not necessary that every person be as satisfied as if he had complete control over what the group decides. What should be stressed is the individual's ability to accept a given ranking on the basis of logic - whatever his/her level of satisfaction - and his/her willingness to entertain such judgment as feasible. When the point is reached at which all group members feel this way you may assume that you have reached a consensus as it is defined here and the judgment may be entered as a group decision. This means, in effect, that a single person can block the group if he/she thinks it necessary; at the same time, it is assumed that this option will be employed in the best sense of fair play.
1. Avoid arguing for your own ranking. Present your position as clearly and logically as possible, but consider seriously the reactions of the group in any subsequent presentations of the same point.

2. Avoid 'win-lose' stalemates in the discussion of rankings. Discard the notion that someone must win and someone must lose in the discussion; when impasses occur, look for the next most acceptable alternative for both parties.

3. Avoid changing your mind only in order to avoid conflict and to reach agreement and harmony. Withstand pressures to yield which have no objective or logically sound foundation. Strive for enlightened flexibility; avoid outright giving up.

4. Avoid conflict-reducing techniques such as the majority vote, averaging, bargaining, coin flipping, and the like. Treat differences of opinion as indicative of an incomplete sharing of relevant information on someone's part and press for additional sharing, either about task or emotional data, where it seems in order.

5. View differences of opinion as both natural and helpful rather than as a hinderance in decision making. Generally, the more ideas expressed the greater the likelihood of conflict will be; but the richer the array of resources will be as well.

6. View initial agreement as suspect. Explore reasons
underlying apparent agreements; make sure that people have arrived at similar solutions for the same basic reasons or for complementary reasons before incorporating such solutions in the group decision.

7. Work to produce the solution that is most acceptable to every member of your group.
Appendix C

Group Training

Training is to be conducted in groups of four to five subjects. Subjects should be seated at a round table. Subjects will put an I.D. number on all handouts.

Introduction (to be read by trainer):

"I'd like to thank you all for coming today. Today we are going to learn something about group decision making. This is an area that has generated quite a bit of research in recent years for several reasons:

First of all, it's been found that in many cases a decision made by a group is superior to a decision made by an individual. Can you offer some suggestions why?" (Trainer listens to possible reasons - responds as positively as possible - summarizes what has been said - then continues by stating reasons listed below.)

"Some reasons why group decisions have been found to be better than individual decisions follow. 1) In a group there are more resources to utilize. Each member of the group is a resource. He or she brings unique information to the group that can be of help in solving the problem at hand. 2) Working in a group allows for the interaction among group members. This interaction allows for the combining of abilities of group members, provokes new thought among group members, and allows each member to check for errors in other members proposed solutions."

"Another reason why there is such an interest in group
decision making, is because companies often utilize groups to help solve the problems they face. In today's complex business world individual employees simply do not have the knowledge, skills, and capabilities necessary to solve many of the problems faced by their companies, so the companies have turned to groups to solve their problems.

"As mentioned previously, group decisions have been found in many cases to be superior to individual decisions. However, several researchers have identified process problems that occur in groups that hinder group performance." "Does anyone have an idea what a process problem is?" (Trainer listens to responses - summarizes what has been said - then continues by stating definition.) "Process problems are those behaviors exhibited by group members that hinder communication between group members. They are behaviors that interfere with the sharing of information. For instance, if one person in the group dominated the conversation and would not let others talk, this would be considered a process problem. Later on we will discuss other examples of process problems that occur in groups." "To help improve the process that occurs in groups, a researcher by the name of John Hall developed a method for improving group decision making. This model is called the Consensus Method of Decision Making, and it is the model that you will be using today. If anyone is familiar with the
Consensus model, that's fine. You may use your knowledge to help you today, but please don't tell anyone in the group about your past experience with consensus decision making. That way everyone starts out at the same level.

Training

"Before we learn how to use the Consensus Method for decision making, I'd like to identify and discuss some process problems that occur in groups. I'm now going to hand out a list of process problems that several researchers have observed in groups trying to make decisions.

(Trainer hands out problems sheet.)
Process Problems Faced By Groups

1. Time and effort are wasted maintaining social-emotional relationships, detracting attention from solving the task at hand.

2. Decisions are made before the problem is carefully analyzed and all possible solutions considered.

3. Members reinforce conforming behavior, thus they are able to avoid exploring conflicting views that might lead to a higher quality decision.

4. Individuals with strong expressive personalities tend to dominate group discussion.

5. Group members participate in solving the problem only to the extent that they feel equal in status and competence to other group members.

6. Participants may be operating by a hidden agenda, which influence their decisions.

7. Group members do not have time to think through ideas independently and thoroughly, thus, resulting in low quality solutions, expressed in generalities.

8. Due to the problems listed above, group participants often perceive a high lack of closure, low self accomplishment and low interest in future phases of problem solving following the end of the meeting.
"What I would like to do now is read through the list together, and I will give a practical example of each of the problems. It may be helpful for you to write down the examples given".

(Trainer reads the first problem listed and then instructs each participant to read a problem. After each problem is read, the corresponding practical example is read by the trainer. Subjects are then asked to explain the problem to ensure their understanding. The trainer then asks if anyone in the group can give an example. He/she also asks if anyone does not understand the problem being discussed. The practical examples are listed below in the corresponding order of the problems on the handout.)

1. A group member is worried that his boss is ignoring him, so he spends his time trying to get his attention, instead of paying attention to the problem being discussed.

2. People in the group are in a rush to move on to another topic, so they don't spend enough time analyzing the problem, and hearing everyone's ideas regarding the proper solution.

3. A group member comes up with an idea and everyone immediately agrees.

4. One person in the group talks the whole time, not letting anyone else share their ideas.

5. A subordinate will not participate in the discussion because his boss is in the group.

6. A department head is more concerned with the amount of money allocated for his/her department than where the money is most needed in the company.

7. The group is operating under too short a deadline, so members do not have time to consider all aspects of the problem. Due to the time limit, the group comes to a hasty decision that is not worked out in detail and, thus, is difficult to implement.
8. Following the end of the meetings, employees do not act on what has been decided upon. They feel that the meeting was a waste of time and that they really did not get a chance to express themselves.

(After going through the list of problems, the trainer asks if anyone has a question about any of the problems identified. After responding to any questions, the trainer continues with the lecture).

"Now that we have identified problems faced by groups, I'd like discuss the Consensus Method of decision making, developed by John Hall. This model of decision making was developed to help groups avoid the process problems that we previously discussed, and hence reach a higher quality decision. Basically, what Hall did was develop a decision rule that stated that all group participants had to agree upon the group decision for the decision to be accepted for use. To help groups reach this consensus decision, Hall developed a set of guidelines that groups should follow. Hall incorporated these guidelines into a decision-making exercise called the NASA task. This is the task that you are going to complete today, first individually, and then as a group. If you are familiar with this task or the Consensus Method that's fine, but please don't share this with the rest of the group. We want everyone to participate as much as possible...."

(Trainer passes out NASA task)

"To get a feel for completing the task, I'd like you to complete it individually. I will now read the problem and
instructions for the NASA task."

(Trainer reads problem out loud and continues by saying:) "We would like you to rank the 15 items by yourself in terms of their importance to your survival. It should take you 10 to 15 minutes to rank the items. When you have completed the rankings, just put them to the side. You may begin now, but before you do, please reread the problem yourself."

(After all individuals have completed the task, the trainer continues:)

"Now that you have completed the task individually, I'd like you to complete the task as a group, following the the consensus method. Here are the guidelines for the consensus decision model, which we will go over together".

(Trainer passes out guidelines for consensus group as well as another NASA task to each participant. The trainer reads the Guidelines for a Consensus Group to the group.)
Guidelines for a Consensus Group

Your group is to employ the method of group consensus in reaching its decision. This means that the ranking for each of the 15 survival items must be agreed upon by each group member before it becomes part of the group decision. Consensus is difficult to reach. Therefore, not every ranking will meet with everyone's complete approval. Unanimity, that is a unanimous decision, is not a goal (although it may be achieved unintentionally), and it is not necessary that every person be as satisfied as if he had complete control over what the group decides. What should be stressed is the individual's ability to accept a given ranking on the basis of logic - whatever his level of satisfaction - and his willingness to entertain such judgment as feasible. When the point is reached at which all group members feel this way, you may assume that you have reached a consensus as it is defined here, and the judgment may be entered as a group decision. This means, in effect, that a single person can block the group if he thinks it necessary; at the same time, it is assumed that this option will be employed in the best sense of fair play".
(Trainer asks if everyone understands what a group consensus is, then continues:)

"The guidelines to use in achieving consensus follow on the next page. We will now go over these together."

(Trainer reads the first guideline to the group, and then instructs each group member to read a guideline out loud. The trainer asks for explanations and questions after each guideline is read.)
1. Avoid arguing for your own rankings. Present your position as clearly and logically as possible, but consider seriously the reactions of the group in any subsequent presentations of the same point.

2. Avoid 'win-lose' stalemates in the discussion of rankings. Discard the notion that someone must win and someone must lose in the discussion; when impasses occur, look for the next most acceptable alternative for both parties.

3. Avoid changing your mind only in order to avoid conflict and to reach agreement and harmony. Withstand pressures to yield which have no objective or logically sound foundation. Strive for enlightened flexibility; avoid outright giving up.

4. Avoid conflict-reducing techniques such as the majority vote, averaging, bargaining, coin flipping, and the like. Treat differences of opinion as indicative of an incomplete sharing of relevant information on someone's part and press for additional sharing, either about task or emotional data, where it seems in order.

5. View differences of opinion as both natural and helpful rather than as a hindrance in decision making. Generally, the more ideas expressed the greater the likelihood of conflict will be, but the richer the array of resources will be as well.

6. View initial agreement as suspect. Explore reasons underlying apparent agreements; make sure that people
have arrived at similar solutions for either the same basic reasons or for complementary reasons before incorporating such solutions in the group decision.

7. Work to produce the solution that is most acceptable to every member of your group.
"Before you solve the NASA problem as a group, I would like you to take five minutes to reread and study the consensus guidelines so you may become more familiar with them. I will let you know when the five minutes are up."

(After five minutes the trainer continues:)

"Keep your guidelines handy so that you may refer to them. Remember, if you have solved this task before, that's fine, but please keep that information to yourself. Does everyone understand your task? You may begin your discussion now."

(When the subjects have indicated they have completed the rankings, the following questions will be used to generate discussion:)

1. Do you feel that you followed the consensus method?
2. Did you feel it was hard/easy to follow the guidelines?
3. Can anyone identify some problems that occurred during the group discussion, that interfered with the group process?
4. What are some things you could do to facilitate the consensus method?

(Trainer should conclude by saying the following:)

"Once again I would like to thank you all for coming today. If anyone would like to see the correct answer to the task, you can look at this sheet. (Trainer passes out one correct answer and then collects it). Please do not
discuss this study with any other students, as they may also wish to participate in this research. (Trainer reassures group that they did a good job at solving the task). You really did a good job solving the task. Does anyone have any questions regarding what you have learned today? (Trainer responds to questions). During your next session, you will have a chance to utilize the consensus method to solve a similar task. It is, therefore, to your advantage to review the consensus guidelines before the next session. Thank you all for coming. See you at the next session which will be Date, Time, Place."

The trainer gives each participant a written reminder telling the subject when and where the next session will be.
Appendix D

Individual Training

Training is to be conducted in groups of four to five subjects. Subjects should be seated at separate desks. Subjects will put an I.D. number on all handouts.

Introduction (to be read by trainer)

"I'd like to thank you all for coming today. Today we are going to learn something about group decision makings. This is an area that has generated quite a bit of research in recent years for several reasons:

First of all, it's been found that in many cases a decision made by a group is superior to a decision made by an individual. Can you offer some suggestions why?"

(Trainer listens to possible reasons - responds as positively as possible - summarizes what has been said - than continues by stating reasons listed below).

"Some reasons why group decisions have been found to be better than individual decisions follow. 1) In a group there are more resources to utilize. Each member of the group is a resource. He or she brings unique information to the group that can be of help in solving the problem at hand. 2) Working in a group allows for the interaction among group members. This interaction allows for the combining of abilities of group members, provokes new thought among group members, and allows each member to check for errors in other members proposed solutions."

"Another reason why there is such an interest in group
decision making, is because companies often utilize groups to help solve the problems they face. In today's complex business world individual employees simply do not have the knowledge, skills, and capabilities necessary to solve many of the problems faced by their companies, so the companies have turned to groups to solve their problems."

"As mentioned previously, group decisions have been found in many cases to be superior to individual decisions. However several researchers have identified process problems that occur in groups that hinder group performance."

"Does anyone have an idea what a process problem is?" (Trainer listens to responses—summarizes what has been said—then continues by stating definition.)

"Process problems are those behaviors exhibited by group members that hinder communication between group members. They are behaviors that interfere with the sharing of information. For instance, if one person in the group dominated the conversation and would not let others talk, this would be considered a process problem. Later on we will discuss other examples of process problems that occur in groups."

"To help improve the process that occurs in groups, a researcher by the name of John Hall developed a method for improving group decision making. This model is called the Consensus Method of Decision Making, and it is the model that you will be using today. If anyone has experience with consensus decision making, that's fine. You may use your
previous experience to help you today. But please keep this information to yourself, so everyone starts at the same level.

**Training**

"Before we learn how to use the Consensus Method for decision making, I'd like to identify and discuss some process problems that occur in groups. I'm now going to hand out a list of process problems that several researchers have observed in groups trying to make decisions.

(Trainer hands out problems sheet)
Process Problems Faced By Groups

1. Time and effort are wasted maintaining social-emotional relationships, detracting attention from solving the task at hand.

2. Decisions are made before the problem is carefully analyzed and all possible solutions considered.

3. Members reinforce conforming behavior, thus, they are able to avoid exploring conflicting views that might lead to a higher quality decision.

4. Individuals with strong expressive personalities tend to dominate group discussion.

5. Group members participate in solving the problem only to the extent that they feel equal in status and competence to other group members.

6. Participants may be operating by a hidden agenda, which influence their decisions.

7. Group members do not have time to think through ideas independently and thoroughly, thus, resulting in low quality solutions, expressed in generalities.

8. Due to the problems listed above, group participants often perceive a high lack of closure, low self-accomplishment, and low interest in future phases of problem solving following the end of the meeting.
"What I would like to do now is read through the list together, and I will give a practical example of each of the problems. It may be helpful for you to write down the examples given".

(Trainer reads each problem listed and its corresponding practical example. Following each problem subjects are then asked to explain the problem to ensure their understanding. The trainer then asks if anyone in the group can give an example. He/she also asks if anyone does not understand the problem being discussed. The practical examples are listed below in the corresponding order of the problems on the handout.)

1. A group member is worried that his boss is ignoring him, so he spends his time trying to get his attention, instead of paying attention to the problem being discussed.

2. People in the group are in a rush to move on to another topic, so they don't spend enough time analyzing the problem and hearing everyone's ideas regarding the proper solution.

3. A group member comes up with an idea, and everyone immediately agrees.

4. One person in the group talks the whole time, not letting anyone else share their ideas.

5. A subordinate will not participate in the discussion because his boss is in the group.

6. A department head is more concerned with the amount of money allocated for his/her department, than where the money is most needed in the company.

7. The group is operating under too short a deadline, so members do not have time to consider all aspects of the problem. Due to the time limit, the group comes to a hasty decision that is not worked out in detail, and thus is difficult to implement.

8. Following the end of the meetings, employees do not act
on what has been decided upon. They feel that the meeting was a waste of time, and that they really did not get a chance to express themselves.

(After going through the list of problems, the trainer asks if anyone has a question about any of the problems identified. After responding to any questions, the trainer continues with the lecture).

"Now that we have identified problems faced by groups, I'd like to discuss the Consensus Method of decision making, developed by John Hall. This model of decision making was developed to help groups avoid the process problems that we previously discussed, and hence, to reach a higher quality decision. Basically, what Hall did was develop a decision rule that stated that all group participants had to agree upon the group decision for the decision to be accepted for use. To help groups reach this consensus decision, Hall developed a set of guidelines that groups should follow. Hall incorporated these guidelines into a decision-making exercise called the NASA task. This is the task that you are going to complete today, first individually, and then as a group."

(Trainer passes out NASA task)

"To get a feel for completing the task, I'd like you to complete it individually. I will now read the problem and instructions for the NASA task."

(Trainer reads problem out loud and continues by saying:)

"We would like you to rank the 15 items by yourself in
terms of their importance to your survival. It should take you 10 to 15 minutes to rank the items. When you have completed the rankings, just put them to the side. You may begin now, but before you do, please reread the problem yourself."

After all individuals have completed the task, the trainer continues:

"Now that you have completed the task individually, I'd like to explain to you how the task would be completed by a group, following the consensus method. I will now pass out the guidelines for the consensus decision model, which we will go over together."

(Trainer passes out guidelines for consensus group as well as another NASA task to each participant.)
Guidelines for a Concensus Group

Your group would employ the method of group consensus in reaching its decision. This means that the ranking for each of the 15 survival items must be agreed upon by each group member before it becomes a part of the group decision. Consensus is difficult to reach. Therefore, not every ranking will meet with everyone's complete approval. Unanimity, that is a unanimous decision, is not a goal (although it may be achieved unintentionally), and it is not necessary that every person be as satisfied as if he had complete control over what the group decides. What should be stressed is the individual's ability to accept a given ranking on the basis of logic - whatever his level of satisfaction - and his willingness to entertain such judgment as feasible. When the point is reached at which all group members feel this way, you may assume that you have reached a consensus as it is defined here, and the judgment may be entered as a group decision. This means, in effect, that a single person can block the group if he thinks it necessary; at the same time, it is assumed that this option will be employed in the best sense of fair play."
(Trainer asks if everyone understands what a group consensus is, then continues:)

"The guidelines to use in achieving consensus follow on the next page We will now go over these together."

(Trainer reads the guidelines to the group, and asks for questions following each.)
1. Avoid arguing for your own rankings. Present your position as clearly and logically as possible, but consider seriously the reactions of the group in any subsequent presentations of the same point.

2. Avoid 'win-lose' stalemates in the discussion of rankings. Discard the notion that someone must win and someone must lose in the discussion; when impasses occur, look for the next most acceptable alternative for both parties.

3. Avoid changing your mind only in order to avoid conflict and to reach agreement and harmony. Withstand pressures to yield which have no objective or logically sound foundation. Strive for enlightened flexibility; avoid outright giving up.

4. Avoid conflict-reducing techniques such as the majority vote, averaging, bargaining, coin flipping, and the like. Treat differences of opinion as indicative of an incomplete sharing of relevant information on someone's part and press for additional sharing, either about task or emotional data, where it seems in order.

5. View differences of opinion as both natural and helpful rather than as a hindrance in decision making. Generally, the more ideas expressed the greater the likelihood of conflict will be, but the richer the array of resources will be as well.

6. View initial agreement as suspect. Explore reasons underlying apparent agreements; make sure that people
have arrived at similar solutions for either the same basic reasons or for complementary reasons before incorporating such solutions in the group decision.

7. Work to produce the solution that is most acceptable to every member of your group.
(Trainer now asks subjects to read over guidelines individually, allows about five minutes - asks for questions.)

After the explanation of the consensus method, the following question will be used to generate discussion.

1. Do you think it will be easy/difficult to follow the consensus method?
2. Can anyone think of some problems that may occur in the group when using the consensus method?
3. What are some things you could do to facilitate the consensus method?

(Trainer should conclude by saying the following:)

"Once again, I would like to thank you all for coming today. If anyone would like to see the correct answer to the task, you can look at this sheet. (Trainer passes out one correct answer and then collects it.) Please do not discuss this study with any other students, as they may also wish to participate in this research. (Trainer reassures group that they did a good job at solving the task.) You really did a good job solving the task. Does anyone have any questions regarding what you have learned today? (Trainer responds to questions.) During your next session, you will have a chance to utilize the consensus method to solve a similar task. It is, therefore, to your advantage to review the consensus guidelines before the next session. Thank you all for coming See you at the next session which will be Date, Time, Place."
The trainer gives each participant a written reminder telling the subject when and where the next session will be.
Appendix E

No Training

Four to five subjects should be seated at individual desks.

Introduction (to be read aloud by trainer)

"I'd like to thank you all for coming today. Today we are going to learn something about group decision making. This is an area that has generated quite a bit of research in recent years for several reasons:

First of all, it's been found that in many cases a decision made by a group is superior to a decision made by an individual. Can any one guess why that might be?" (Trainer listens to possible reasons - responds as positively as possible - summarizes what has been said - than continues with reasons listed below).

"Some reasons why group decisions have been found to be better than individual decisions follow. 1) In a group there are more resources to utilize. Each member of the group is a resource. He or she brings unique information to the group that can be of help in solving the problem at hand. 2) Working in a group allows for the interaction among group members. This interaction allows for the combining of abilities of group members, provokes new thought among group members, and allows each member to check for errors in other members proposed solutions."

"Another reason why there is such an interest in group decision making is because companies utilize groups all the
time to help solve the problems they face. In today's complex business world individual employees simply do not have the knowledge, skills, and capabilities necessary to solve many of the problems faced by their companies, so the companies have turned to groups to solve their problems."

"As mentioned previously, group decisions have been found in many cases to be superior to individual decisions. What I am passing out now is an example of a problem used to study group decision making. (Trainer passes out NASA task ranking sheet).

"This is the NASA task. Take a few minutes and complete the task by yourself."

(Following the completion of the task, the trainer continues with:)

"Research has found that if you had completed this task as a group, your answer would be closer to the correct answer (A discussion of this issue follows.) If you would like, you can see the correct answer to this problem after our meeting today. In your next session you will have a chance to work in groups to solve a problem. Your next session will be Time, Date, Place". The trainer gives each participant a written reminder telling the subject when & where the next session will be held.
Appendix F

Zin Obelisk Group Instruction Sheet

In the ancient city of Atlantis, a solid, rectangular obelisk, called a Zin, was built in honor of the goddess Tina. The structure took less than two weeks to complete.

The task of your team is to determine on which day of the week the Zin was completed, and how many working days it took to complete, using the consensus method of decision making. This is the model you learned about in your last session.*

You will be given cards containing information related to the task. These cards will be passed out later. You may share the information on these cards orally, but you may not show your cards to any other participant.

* This section is modified for subjects in the No-Training Condition.
Zin Obelisk Information Cards

1. The basic measurement of time in Atlantis is a day.
2. An Atlantian day is divided into schlibs and ponks.
3. The length of the Zin is 50 feet.
4. The height of the Zin is 100 feet.
5. The width of the Zin is 10 feet.
6. The Zin is built of stone blocks.
7. Each block is 1 cubic foot.
8. Day 1 in the Atlantian week is called Aquaday.
9. Day 2 in the Atlantian week is called Neptiminus.
10. Day 3 in the Atlantian week is called Sharkday.
11. Day 4 in the Atlantian week is called Mermaidday.
12. Day 5 in the Atlantian week is called Daydoldrum.
13. There are 5 working days in the Atlantian week.
14. The working day has 9 schlibs.
15. Each worker takes rest periods during the working day totaling 16 ponks.
16. There are 8 ponks in a schlib.
17. Workers each lay 150 blocks per schlib.
18. At any one time when work is taking place there is a gang of nine people working on site.
19. One member of each gang has religious duties and does not lay blocks.
20. No work takes place on Daydoldrum.
21. What is a cubitt?
22. A cubitt is a cube, all sides of which measure 1 megalithic yard.
23. There are 3 1/2 feet in a megalithic yard.
24. Does work take place on Sunday?
25. What is a Zin?
26. Which way does the Zin stand?
27. The Zin is made up of green blocks.
28. Green has special religious significance on Mermaidday.
29. Each gang includes two women.
30. Work starts at daybreak on Aquaday.
31. Only one gang is working on the construction on the Zin.
32. There are eight gold scales in a gold fin.
33. Each block costs 2 gold fins.
Answer and Rationale

Answer: The Zin was completed on Neptiminus. It took 5.95 working days to complete.

Rationale:
1. The dimensions of the Zin indicate that it contains 50,000 cubic feet of stone blocks.
2. The blocks are 1 cubic foot each, therefore, 50,000 blocks are required.
3. Each worker works 7 schlibs in a day (2 schlibs are devoted to rest).
4. Each worker lays 150 blocks per schlib; therefore, each worker lays 1,050 blocks per day.
5. There are 8 workers per day, therefore 8,400 blocks are laid per working day.
6. The 50,000th block, therefore, is laid on the sixth working day.
7. Since work does not take place on Daydoldrum, the sixth working day is Neptiminus.
Appendix G
Appendix G
Implementation For Individuals Trained in Teams
Implementation to be conducted in the same teams that the subjects were originally trained in.
Subjects should be seated around a circular or square table.
PLEASE INSTRUCT ALL SUBJECTS TO PUT I.D. ON ALL HANDOUTS

Introduction (to be read by trainer)
"I'd like to thank you all for coming back today. Today we are going to solve a task in groups using the consensus decision making model, the model that you learned about in the last session. You are going to use the consensus model to solve a task in a group. The task is called the ZIN OBELISK problem.
(Trainer passes out ZIN problem and reads it out loud).
Zin Obelisk Group Instruction Sheet

In the ancient city of Atlantis, a solid, rectangular obelisk, called a Zin, was built in honor of the goddess Tina. The structure took less than two weeks to complete.

The task of your team is to determine on which day of the week the obelisk was completed, and how many working days it took to complete, using the consensus model of decision making. This is the model you learned about in the last session. We will review it again shortly.

You will be given cards containing information related to the task. These cards will be passed out later. You may share this information orally, but you may not show your cards to any other participant.
(Trainer continues with the following:)

"I will now pass out and then review out loud the guidelines for consensus group decision making. These are the same guidelines that you received in the last session; however, this time they are geared to the ZIN task, rather than the NASA task".

(Trainer passes out guidelines and reads them out loud)
Guidelines for a Consensus Group

Your group is to employ the method of group consensus in reaching its decision. This means that the final decision made by the group regarding when the Zin was completed and how many working days it took to complete, must be agreed upon by each group member before it becomes a part of the group decision. Consensus is difficult to reach. Therefore, the final decision may not meet with everyone's complete approval. Unanimity, that is a unanimous decision, is not a goal (although it may be achieved unintentionally); and it is not necessary that every person be as satisfied as if he had complete control over what the group decides. What should be stressed is the individual's ability to accept a given ranking on the basis of logic - whatever his level of satisfaction - and his willingness to entertain such a judgment as feasible. When the point is reached at which all group members feel this way you may assume that you have reached a consensus, as it is defined here, and the judgment may be considered the group's final decision. This means, in effect, that a single person can block the group if he thinks it necessary; at the same time, it is assumed that this option will be employed in the best sense of fair play".
(Trainer asks if everyone understands what a group consensus is, then continues:)

"The guidelines to use in achieving consensus follow on the next page. We will now go over these together."

(Trainer reads the first guideline out loud, and then instructs each participant to read one guideline to the group. The trainer asks for questions and explanations after each guideline is read.)
1. Avoid arguing for your own rankings. Present your position as clearly and logically as possible, but consider seriously the reactions of the group in any subsequent presentations of the same point.

2. Avoid 'win-lose' stalemates in the discussion of rankings. Discard the notion that someone must win and someone must lose in the discussion; when impasses occur, look for the next most acceptable alternative for both parties.

3. Avoid changing your mind only in order to avoid conflict and to reach agreement and harmony. Withstand pressures to yield which have no objective or logically sound foundation. Strive for enlightened flexibility; avoid outright giving up.

4. Avoid conflict-reducing techniques such as the majority vote, averaging, bargaining, coin flipping, and the like. Treat differences of opinion as indicative of an incomplete sharing of relevant information on someone's part and press for additional sharing, either about task or emotional data, where it seems in order.

5. View differences of opinion as both natural and helpful rather than as a hindrance in decision making. Generally, the more ideas expressed the greater the
likelihood of conflict will be; but the richer the array of resources will be as well.

6. View initial agreement as suspect. Explore reasons underlying apparent agreements; make sure that people have arrived at similar solutions for either the same basic reasons or for complementary reasons before incorporating such solutions in the group decision.

7. Work to produce the solution that is most acceptable to every member of your group.
"Before you begin solving the Zin Obelisk problem please reread and study the consensus guidelines. You will have five minutes to do so. I will tell you when the five minutes are up."

(The trainer continues with:)

"Here are the Zin Obelisk information cards. (Trainer randomly passes out information cards.) We will now read the instructions to the Zin Obelisk problem again. (Trainer reads problem aloud.) Now, take about five minutes to read and study the problem by yourself".

(Trainer continues with:)

"Remember, you are to solve the problem using the consensus method. Please feel free to refer to your consensus guidelines during the group problem solving discussion. Here is a calculator to help you solve the problem. Does anyone have any questions? You may begin your discussion now." (Trainer records starting time.)

When the task is completed, trainer records answer and finish time.

Following the completion of the task, the trainer collects the group answer, and asks each participant to write down when they thought the obelisk was completed. He/she then passes out the group satisfaction questionnaire, and instructs participants to complete it. After the questionnaire is completed, the trainer distributes and then collects the correct answer to the Zin problem. The trainer then asks the subjects if they have any questions regarding
the study - assures the group that they did a good job - and thanks them for their cooperation. The participants are also instructed not to discuss the study with any other student, since they may wish to participate in the study.
Appendix H
Appendix H

Implementation For Individually Trained Subjects

Implementation is to be conducted in groups of four to five subjects.

Subjects should be seated around a circular or square table.

PLEASE INSTRUCT ALL SUBJECTS TO PUT I.D. ON ALL HANDOUTS

Introduction (to be read by trainer)

"I'd like to thank you all for coming back today. Today are going to solve a task in groups using the consensus decision making model, the model that you learned about in the last session. You are going to use the consensus model to solve a task in a group. The task is called the ZIN OBELISK problem.

(Trainer passes out ZIN problem and reads it out loud).
In the ancient city of Atlantis, a solid, rectangular obelisk, called a Zin, was built in honor of the goddess Tina. The structure took less than two weeks to complete.

The task of your team is to determine on which day of the week the Zin was completed, and how many working days it took to complete, using the consensus model of decision making. This is the model you learned about in the last session. We will review it again shortly.

You will be given cards containing information related to the task. These cards will be passed out later. You may share this information orally, but you may not show your cards to any other participant.
(Trainer continues with the following:)

"I will now pass out and then review out loud the guidelines for consensus group decision making. These are the same guidelines that you received in the last session; however, this time they are geared to the ZIN task, rather than the NASA task".

(Trainer passes out guidelines and reads them out loud.)
Guidelines for a Consensus Group

Your group is to employ the method of group consensus in reaching its decision. This means that the final decision made by the group regarding when the Zin was completed and how many working days it took to complete, must be agreed upon by each group member before it becomes a part of the group decision. Consensus is difficult to reach. Therefore, the final decision may not meet with everyone's complete approval. Unanimity, that is a unanimous decision, is not a goal (although it may be achieved unintentionally); and it is not necessary that every person be as satisfied as if he had complete control over what the group decides. What should be stressed is the individual's ability to accept a given ranking on the basis of logic - whatever his level of satisfaction - and his willingness to entertain such a judgment as feasible. When the point is reached at which all group members feel this way, you may assume that you have reached a consensus as it is defined here, and the judgment may be considered the group's final decision. This means, in effect, that a single person can block the group if he thinks it necessary; at the same time, it is assumed that this option will be employed in the best sense of fair play". 
(Trainer asks if everyone understands what a group consensus is, then continues:)

"The guidelines to use in achieving consensus follow on the next page. We will now go over these together."

(Trainer reads the guidelines to the group. After each guideline is read, the trainer entertains questions.)
1. Avoid arguing for your own rankings. Present your position as clearly and logically as possible, but consider seriously the reactions of the group in any subsequent presentations of the same point.

2. Avoid 'win-lose' stalemates in the discussion of rankings. Discard the notion that someone must win and someone must lose in the discussion; when impasses occur, look for the next most acceptable alternative for both parties.

3. Avoid changing your mind only in order to avoid conflict and to reach agreement and harmony. Withstand pressures to yield which have no objective or logically sound foundation. Strive for enlightened flexibility; avoid outright giving up.

4. Avoid conflict-reducing techniques such as the majority vote, averaging, bargaining, coin flipping, and the like. Treat differences of opinion as indicative of an incomplete sharing of relevant information on someone's part and press for additional sharing, either about task or emotional data, where it seems in order.

5. View differences of opinion as both natural and helpful rather than as a hindrance in decision making. Generally, the more ideas expressed the greater the likelihood of conflict will be; but the richer the array of resources will be as well.

6. View initial agreement as suspect. Explore reasons underlying apparent agreements; make sure that people
have arrived at similar solutions for either the same basic reasons or for complementary reasons before incorporating such solutions in the group decision.

7. Work to produce the solution that is most acceptable to every member of your group.
"Before you begin solving the Zin Obelisk problem please reread and study the consensus guidelines. You will have 5 minutes to do so. I will tell you when the 5 minutes are up."

The trainer continues with:

"Here are the Zin Obelisk information cards. (Trainer randomly passes out information cards.) We will now read the instructions to the Zin Obelisk problem again. (Trainer reads problem aloud.) Now, take about five minutes to read and study the problem by yourself".

Trainer continues with:

"Remember, you are to solve the problem using the consensus method. Please feel free to refer to your consensus guidelines during the group problem solving discussion. Here is a calculator to help you solve the problem. Does anyone have any questions? You may begin your discussion now." (Trainer records starting time.)

When the task is completed, trainer records finish time.

Following the completion of the task, the trainer collects the group answer, and asks each participant to write down when they thought the Zin was completed. He/she then passes out the group satisfaction questionnaire, and instructs participants to complete it. After the questionnaire is completed, the trainer distributes and then collects the correct answer to the Zin problem. The trainer then asks the subjects if they have any questions regarding
the study - assures the group that they did a good job - and thanks them for their cooperation. The participants are also instructed not to discuss the study with any other student, since they may wish to participate in the study.
Appendix I
Appendix I

Implementation For Subjects in the No -Training Condition

Subjects randomly assigned to groups of four to five people.

Subjects should be seated around a round or square tables.

PLEASE HAVE SUBJECTS PUT I.D. NUMBER ON ALL HANDOUTS

Introduction (to be read by trainer)

"I'd like to thank you all for coming today. Today you are going to participate in a group decision-making task. This is an area that has generated quite a bit of research lately because it's been found that in many situations a group decision is better than an individual decision. In fact, in most businesses today, groups are used to make many important decisions. Companies have found that individual employees simply do not have knowledge, skills, or capabilities necessary to solve many of the problems they face. They have found that groups of people do have the necessary skills".

"What I'm passing out to you is the problem that you will solve today as a group."

(Trainer passes out ZIN task to each group and reads instructions out loud.)
Zin Obelisk Group Instruction Sheet

In the ancient city of Atlantis, a solid, rectangular obelisk, called a Zin, was built in honor of the goddess Tina. The structure took less than two weeks to complete.

The task of your team is to determine on which day of the week the Zin was completed and how many working days it took to complete. You are to solve the problem as a group. You will be given cards containing information related to the task. These cards will be passed out later. You may share this information orally, but you may not show your cards to other participants.
(Trainer continues:)

"Your task today is to solve the ZIN problem using group decision making. Here are the Zin Obelisk information cards. (Trainer randomly passes out information cards.) We will now read the instructions to the Zin Obelisk problem again. (Trainer reads problem aloud.) Now take about five minutes to read and study the problem yourself."

(The trainer continues with:)

Here is a calculator that might assist you in solving the problem. Does anyone have any questions? You may begin your discussion now". (Trainer records starting time.)

When the task is completed, the trainer records the finish time.

Following the completion of the task, the trainer collects the group answer. He/she then instructs subjects to individually write down the day they felt the Obelisk was completed. He/she then passes out the group satisfaction questionnaire and instructs participants to fill it out. After the questionnaire is completed, the trainer distributes the correct answer - entertains questions - collects correct answer - assures the group that they did a good job - and thanks them for their cooperation. The trainer instructs the subjects not to discuss the study with any other students, since they might want to participate in the studys.
Appendix J
Appendix J

Questionnaire

Instructions: Please circle the number of the statement that most accurately describes your feelings for each of the following questions.

A. To what extent did you feel free to participate and contribute your ideas?
   1. I did not feel free.
   2. I felt somewhat free.
   3. I felt moderately free.
   4. I felt mostly free.
   5. I felt completely free.

B. To what extent did you feel your time was well spent in your group?
   1. Not all well spent.
   2. Somewhat well spent.
   3. Moderately well spent.
   4. Mostly well spent.
   5. Very well spent.

C. How satisfied were you with the quality of ideas produced by your group?
   1. Not at all satisfied.
   2. Somewhat satisfied.
   4. Mostly satisfied.
   5. Very satisfied.

D. How satisfied were you with the quantity (number) of ideas produced by your group?
   1. Not at all satisfied.
   2. Somewhat satisfied.
   4. Mostly satisfied.
   5. Very satisfied.

E. To what extent do you feel the method your group used was an effective way to evaluate ideas?
   1. Totally ineffective.
   2. Somewhat effective.
   3. Moderately effective.
   4. Mostly effective.
   5. Extremely effective.
F. To what extent do you feel the method used by your group was an effective way to generate ideas?
   1. Totally ineffective.
   2. Somewhat effective.
   3. Moderately effective.
   4. Mostly effective.
   5. Extremely effective.

G. To what extent do you feel the meeting you just participated in is an effective way to deal with a problem?
   1. Totally ineffective.
   2. Somewhat effective.
   3. Moderately effective.
   4. Mostly effective.
   5. Extremely effective.

H. How satisfied were you with the training you received in your first session?
   1. Not at all satisfied.
   2. Somewhat satisfied.
   4. Mostly satisfied.
   5. Extremely satisfied.
I. In general, what did you like most about the group you just participated in?

J. In general, what did you like least about the group you just participated in?
References


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