

THE INFLUENCE OF THE EMERGENT INFORMAL
GROUP LEADER ON UNANIMOUS GROUP
DECISIONS

By

ROBERT FRANK FULTON

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Thesis Approved:

Mark Knaack

Thesis Adviser

Brent M. Snow

William E. Jaynes

Norman D. Durham

Dean of the Graduate College

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CHAPTER I

INTRODUCTION

The purpose of this study was to investigate the influence of work-group leaders on decisions made by individual group members while solving a problem requiring the unanimous agreement of group members. Major emphasis was placed on sociometric data for emergent leadership identification, and on shifts in individual member responses from those given individually before the work-groups were formed, towards the values of their leader after 11 weeks of work-group interaction.

Background

Groups have been studied as social units at both their own level and at the level of analysis of the individual members since the 1920's (Hare, 1976).

Social influence was recognized as having an effect on individual behavior as early as 1897 when Triplett investigated the effects of competition on individual performance. Bicycle racers turned in their fastest times when directly competing with other racers. Triplett labeled this phenomenon "dynamogenic theory", and tested his hypothesis with fishing reel devices which could be operated by either one

person alone, or two individuals simultaneously. "Triplett found that the together (competition) situation produced much faster rates, and thus concluded that this dynamogenic theory was verified" (Shaw, 1971, p. 55).

This early work of Triplett falls into the area of research concerned with a number of individuals working on the same task, but with each person working as an individual. Later studies led to research during the 1920's on the effects of both passive and coacting (usually loud encouragement, but from a distance) audiences in the areas of judgment, problem solving and learning (Asch, 1956; Allport, 1965).

Early reference to leadership within groups was made by Dashiell (1937) when he wrote ". . . the individual person often shows, wittingly or unwittingly, deference to the attitudes and opinions of (both) a majority and to those of persons enjoying prestige . . ." (p. 495), both in the formal exercise of public authority and in subtle interpersonal relations.

Important early research on groups was begun when the National Research Council was employed by Western Electric during the period of 1924-1931 to research methods by which employee productivity could be improved. Their study began with the initial objective of answering six basic questions for Western Electric:

1. Do employees actually get tired out?
2. Are rest periods desirable?

3. Is a shorter work day desirable?
4. What is the attitude of employees toward work and toward the company?
5. What is the effect of changing the type of working equipment?
6. Why does production fall off in the afternoon?

The initial assumptions of the experimenters dealt with only the individual worker's effectiveness in the workplace, and recognized individual variables of:

1. physiological status (health, skill, endurance),
2. mental state (contentment, fear, anger shame, etc.),
3. zest for work (enjoyment, feelings of "just" treatment, and desire for reward) (Turner, 1933, pp. 577-579).

The initial manipulations involved the variables of lighting changes for selected work groups. Production increased when illumination was increased, production increased when illumination was decreased, and production increased in the control group for which illumination remained constant (Mayo, 1933; Turner, 1933; Rothlisberger & Dickson, 1939). The researchers were confused. And the effects both of experimental participation and of the informal work-group were not understood until many years later. So new variables of modified group-incentive pay rates, rest pauses, types of supervision, and length of the work day were introduced. The experimenters ". . . exhaustively

examined all the traditional variables of industrial psychology - methods, fatigue, monotony, and the wage incentive system - and then started two new experiments, the 'Second Relay Assembly Group' and the 'Mica-Splitting Test Room' to further examine the effect of incentives and rest changes. These results were quite ambiguous" (Perrow, 1979, p. 92). "That these findings should be labeled 'discoveries' indicated how little members of management and industrial psychologists - and indeed, industrial sociologists if there were any at that time - knew about actual organizations" (Perrow, 1979, p. 93).

The literature indicates that the Western Electric ("Hawthorne") studies were the beginning recognition of the importance of social influence in the workplace.

In 1942 Kurt Lewin predicted that:

Although the scientific investigations of group work are but a few years old, I don't hesitate to predict that group work - that is, the handling of human beings not as isolated individuals, but in the social setting of groups - will soon be one of the most important theoretical and practical fields. . . . There is no hope for creating a better world without a deeper scientific insight into the function of leadership and culture, and of other essentials of group life. (Zander, 1979, p. 418)

A consistent problem throughout early research on groups is that the term "group" was applied to what was most frequently no more than a collection of people brought together for the purpose of a particular study (Sherif & Sherif, 1969).

Definitions

Operationalization of the term "group" for this study shall be accomplished by adopting Sherif's definition:

Groups defined:

A group is a social unit consisting of a number of individuals who stand in role and status relationships to one another, stabilized in some degree at the time, and who possess a set of values or norms of their own regulating their behavior, at least in matters of consequence to the group. (Sherif & Sherif, 1969, p. 131)

This definition allows for recognition of the time element for norm development, for status (i.e. for leadership) to develop within the group, and is adequate to describe formal, informal, large or small groups.

Role relations refer to characteristic reciprocal and expected behaviors of individuals during group interaction (Borgatta & Bales, 1953; Sherif & Sherif, 1969; Shaw, 1971; Hare, 1976; Vander Zanden, 1977).

Borgatta and Bales (1953) observed emerging leaders to be highly active in initiation of both suggestions and opinions in their first "new group" session, engage in a power and status struggle in their second session, and to become less active after his/her position is established and less effort is required to maintain acceptance of their initiated opinions and suggestions.

Status within a group denotes an individual's place in the hierarchy (formal or informal structure) of a group, and is usually thought of as the power (or authority) dimension of a group (MacNeil, 1967; Sherif & Sherif, 1969;

Stogdill, 1974; Vander Zanden, 1977). Power refers to the individual's exercise of "effective initiative" over time, during activities, decision making, and interactions with group members (Sherif & Sherif, 1969). Vander Zanden also points out that power is relative; one cannot have social power all by oneself. Stogdill (1974) defines power as "an influence or exchange relation" (p. 276), and goes on to say that ". . . the person employing power tries to 'maximize expected utility'". (p. 285)

Shaw (1971) distinguishes between "status" and "position" when he writes:

When one identifies a person's position in the group, one is at the same time identifying his relative standing with respect to such dimensions as power, leadership, and attractiveness. Status, on the other hand, refers to the evaluation of that position. It is the rank accorded the position by group members - the prestige of the position (p. 241).

Norms may be considered to be standardized generalizations that apply to classes of objects to include people, events and behavior, and are evaluative in nature. These norms are rules, both written and unwritten, which may apply to individual group members to varying and different degrees (MacNeil, 1967; Sherif & Sherif, 1969; Shaw, 1971; Stogdill, 1974; Hare, 1976). And in addition to norms which are formed as a result of group interaction over time, each prospective group member also brings with them their own personal norms which are based on their individual past experiences.

Organization (structure) shall be defined as ". . . an interdependent network of roles and hierarchial statuses defining the reciprocal expectations, responsibilities, and power arrangements of the membership in a normatively oriented social unit (small or large)" (Sherif & Sherif, 1969, p. 150). This definition will be adequate for both the individuals within the group (organization), and for the group itself as a member (social unit) within a larger organization.

Cohesiveness for this study shall be defined as ". . . those forces which derive from the attractiveness of group members" for each other (Thibaut, 1956, p. 106). This may be measured with a sociometric technique (Appendix A) and operationalized as the amount of "liking" the members express for their group.

Effective initiative refers to the initiation of ideas or decisions which are subsequently followed by the group.

Conformity in Judgments

Experimental studies on the effect of "group" pressure and conformity were frequently a simple circumstance of a majority concensus involving collections of people brought into the laboratory. Depending upon the degree of structure inherent in the situation or task, e.g. Sherif's autokinetic studies versus Asch's matching lines, individuals, when greatly outnumbered in unstructured decision tasks, tend to agree with the majority opinion even when they internally disagree (Asch, 1956; Sherif & Sherif, 1969). Individuals

are also likely to internalize those norms formed in the laboratory in relation to highly unstructured stimuli and pass them on to successive generations of subjects (Asch, 1956; Jacobs & Campbell, 1962; Sherif & Sherif, 1969; MacNeil & Sherif, 1976). This cited research is examining the effect of the "group" upon the judgments and decisions made by an individual, rather than the effect of an individual upon the decisions made by the group.

Natural Formation of Group Structure

Groups occur naturally throughout human culture. Faris (1953), Sayles and Strauss (1966), and Sherif and Sherif (1969) conclude that the literature shows groups to be the natural habitat of human beings.

Groups may also be described both in terms of their own internal organization (structure) and as their being distinct social units within a larger system or organization (Asch, 1956; Sherif & Sherif, 1969; Miller, 1971; MacNeil & Sherif, 1976).

According to Sherif and Sherif (1969), natural group formation requires that four elements be present before the collection of people may be considered to be a group.

1. a shared motivational base,
2. organizational (or "group") structure of roles and statuses which differentiate between members and from non-members,
3. a set of norms, and
4. group-produced differential effects on the atti-

tudes and behaviors of individual members.

Sherif's 1954 Robber's Cave studies demonstrated how, after about a week in a situation requiring interdependent activity by a collection of people (boys), and without having had a status hierarchy imposed upon them by a "higher authority",

one boy in each group began to rank highest in the exercise of effective initiative across situations, frequently with the close assistance of one or two others of high rank. Some boys were sifted toward the bottom of the emerging structure while others jockeyed for higher positions of respect and influence. (Sherif & Sherif, 1969, p. 233)

The emergent group leaders were identified by observing which individuals exercised "effective initiative" in both task and decision-making situations both within the groups and in inter-group relations. When the observer was satisfied that his observations were accurate and that the group structure was stable, an independent rater watched the groups. Finally, informal sociometric choices were obtained directly from the boys. "The rank-order correlations among these (three) measures were significantly high in every case" (Sherif & Sherif, 1969, p. 233).

Blake and Mouton (1962) found while working with 150 groups in adult workshops, including individuals from both industrial organizations and college students, that structure and norms developed after 10 to 18 hours of group interaction. To examine the effect of problem-solving tasks upon their groups, they designed a situation within which:

intergroup relations were varied by assigning all groups a problem with the aim of arriving at the best solution possible as a group and a better solution than other groups might offer. The effects of this 'win-lose' competition on the in-groups were as follows:

1. Status relations within the groups were 'refined' and 'consolidated.' In short, intergroup competition affected the in-group structure.
2. Groups closed their ranks to pull together to win. Bickering within the groups was reduced. In other words, solidarity or cohesiveness within groups increased. (p. 263).

Task Forces and Project Teams

There are particular types of "groups" which are deliberately formed by organizations for the express purpose of maintaining integration within the organization by (1) dealing with constantly recurring problems, and (2) for solving new or temporary problems which affect a number of departments within the organization. The titles generally given to these groups are "project teams" and "task forces".

These processes fall under the general category of "lateral relations" within an organization, and by their operation reduce the pressure on higher status members in the organizational hierarchy. This is accomplished by "reducing the number of decisions being referred upward" in the hierarchy (Galbraith, 1973 p. 46). Galbraith goes on to say that the major difference between project and task teams is that a ". . . task force is a temporary patchwork on the functional structure, used to short-circuit communication lines in a time of high uncertainty. When uncertainty decreases, the functional hierarchy resumes its guiding

influence" (p. 51). Project teams, on the other hand, are formed around frequently occurring problems within an organization for the purpose of freeing higher-status individuals from day-to-day operational decisions.

The formation of either "task" or "project" functions provides benefits to the organization of:

1. Reducing coordination problems between organizations or departments which have reciprocal interdependence,
2. Providing a means to efficiently handle unique or craft-type (e.g. hand tooling) tasks when they arise, and
3. Resolving conflicts between the perceived needs of different departments.

Natural groups differ from work groups in one major respect: natural groups are self-selected entities whose membership is comprised of individuals who have voluntarily included themselves into a sub-social system and have adopted its norms and its goals as being, to some degree, their own.

Task forces and project teams, however, are purposefully formed in an organizational environment. Assignment to one of these work groups may be influenced to some degree by its prospective members, but should not be considered as being "voluntary" for its membership in the same sense as for membership in natural groups.

Both natural groups and organizational task and project

groups are similar beyond the content of our definition of "group" on page 5. An additional similarity is that they all address themselves, as stated by Tuckman (1965), to task completion through interpersonal contact. This factor is also implicit within the "status and role" relations as contained in our referenced definition of "group".

In a study using a banking organization as a research base to determine optimal size for empirical groups, James (1951) found that the optimal size for "action-taking" groups (or sub-groups) to be 6.5 members, while that for "non-action-taking" groups to be 14.0. But here, James' "non-action-taking" groups do not appear to meet our definition of "group" in the pure sense, as the requirement of face-to-face interaction would place a maximum upper limit on a group of about 12. His "non-action-taking" groups were, in all likelihood, not real groups at all.

Action-taking for James, however, is in reference to a group functioning in a decision-making capacity.

James also noted that "leaders with common problems met informally in groups of two, three or more at any time the need arose. The issues were discussed, a consensus reached, and recommendations were presented to the formal authority having jurisdiction over the matter" (p. 475). He also found that groups of five and above were unstable and quickly divided into subgroups, and that "freely forming and unforming groups undergoing continuous interaction are very small, falling within a size range of about 2 - 7, and hav-

ing an average size of about three" (p. 477). It is quite possible that James' "groups" were not groups by Sherif's definition in every instance. But James' "groups" were similar to the collections of people that one might find in task-force or project-team situations.

It would appear, then, that groups could be formed with group membership being entirely composed of leaders of other groups. And this describes the membership of some task-forces and project teams which have been deliberately formed by larger organizations.

As Galbraith (1973) points out, for the team model to be effective the membership must be composed of individuals who possess sufficient control over resources to have ". . . the authority to commit their function (department, etc.) to the team's choice of alternatives" (p. 81), and that individuals who possess this level of authority are also in positions of power within their own departments or subunits (see p. 6 for discussion of power). Effective project-teams and task-forces, then, after sufficient interaction has occurred over time for norms and for status to develop, are composed of members who as individuals are usually formal leaders in their own organizational sub-units, and who also possess a role and status position within the task or project group of which they are a member (Lickert, 1961; Sayles & Strauss, 1966).

Functions of the Informal Leader

Ideally, discussion and/or conflict between work-group

members while in a problem-solving situation will trigger a search for alternative solutions. If such a search is not triggered, then possible alternative solutions will not be shared for discussion or consideration, information is likely to be withheld by team members rather than being shared, and an individual team member who perceives themselves as being in a power position will attempt to "force" a solution of their own upon the team (Galbraith, 1973). As Galbraith goes on to explain, this type of "forcing" may actually be desirable for the organization if the organizational goals are compatible with those of the individual doing the "forcing". But in this respect, it may also be desirable for the organization to have an understanding of the individual influence which is present within what will become a consensual recommendation from a collection of people who have been assigned to work on a common problem.

In a typical (formally unstructured) work-group, the informal leader provides the vital functions of: (1) initiation of action, (2) facilitation of consensus, and (3) liaison with the "world" outside of the group if that should be necessary. And, unless the work-group is small, those functions are likely to be shared by several members who collectively comprise the leadership of the group (Sayles & Strauss, 1966; Miller, 1971).

In addressing the leadership responsibility of facilitation of consensus, Quay (1971) says that:

Consensus is absolutely indispensable to the work group. Without essential agreement,

there cannot be any joint action at all. Consequently, securing consensus, both general and specific, is the most significant continuing function of a group leader. (p. 1079)

In addressing leadership studies, Jackson and Morgan (1978) state that:

The hundreds of scientific studies (of leadership - sic) come to one general conclusion: leadership is highly variable or "contingent" upon a large variety of important variables such as nature of task, size of the group, length of time the group has existed, type of people within the group and their relationships with each other, and the amount of pressure the group is under. . . . Leadership involves more than smoothing the paths of human interaction. (p. 62)

This agrees with Sherif and Sherif (1969) who say that "leadership" studies have had little success in identifying general personality traits which characterize group leaders across situations, but that the group leader must live up to ". . . the group's idealized conception of what a group member should be" (p. 91). And since the interest of this study is in work-groups upon which leadership has not been imposed, and the size of the groups will be considered to be "small" (generally six or less), the literature indicates that there should be a single leader which will emerge and provide the cited three functions for the group (p. 14).

CHAPTER II

PROBLEM AND HYPOTHESES

Description of the Problem

If the purpose of project teams and task forces within an organization is to fulfill the purposes of coordination for unique problem-solving and for conflict resolution, then the influence of any particular individual or collection of individuals within these groups may be of interest to the organization. The focus of this research is on these particular types of work groups, and on the influence of the "unofficial" group leader(s) in their decision-making process.

The fundamental question to be answered is whether the decisions made by a project team or task force are the products of group interaction, or whether an emergent leadership structure will have a disproportionate influence and will "force" solutions to problems upon the other members of the group. Based upon the research cited in Chapter I, it is expected that informal, emergent leadership will have a measurable influence upon unanimous decisions reached by the group.

It is not the purpose of this study to explore the rel-

ative merits of individual versus group decisions on the basis of organizational economic effectiveness (cost in terms of manpower expenses, etc.). Nor is the focus on the superiority/inferiority of group versus individual decisions, on the "risky-shift", on the "conservative-shift", nor on "lower-level" decision groups. Lower-level decision groups here refers to lower-status employees who are deliberately formed into groups for the single purpose of making decisions which will be acceptable primarily to their peers, such as arrangements for a company picnic, deciding on a color to paint a washroom, etc. Rather, the focus of this study is at the decision-making level where the quality of decisions is of primary importance to the organization (see task forces and project teams, pp. 10-11).

Process Problems

The research problems now become those of:

1. obtaining access to functioning work-groups which meet the cited requirements of "group",
2. identifying the leader in each group and determining if there is a single emergent leader or if there are other persons of comparatively high status in each group, and
3. measuring the influence of this (these) individual(s) upon the other group members when group consensus (unanimous agreement) is required for success in a decision-making task.

Obtaining Access to Work-groups

Work-groups were composed of upper-level undergraduate students at Oklahoma State University.

One section of Psychology 3413 (The Psychology of Social Behavior) and two sections of Psychology 3743 (Introduction to Social Psychology) deliberately place students into work-groups at the beginning of each semester. Students are assigned to groups randomly, balanced by sex, and remain in their respective groups throughout the semester.

The students in Psychology 3413 complete weekly examinations, first as individuals, and then again as groups, with all members within each group receiving both an individual and a group grade for each examination. Agreement of all group members is required for all "group" examination answers, and this "group grade" accounts for thirty percent (30%) of each student's final grade for the course.

The students in Psychology 3743 are required to complete two group projects either of their own design or selected from reference books in social psychology. Each of these projects is presented first as a proposal, the proposal is executed "in the field", and each project is then summarized in a short paper by the group for a grade which is given to all participants. These groups tend to sit together during class, meet outside of class in planning sessions, and make their own decisions on who will proceed with what responsibilities. The only required contact of these project-groups with a "higher authority" is in obtain-

ing approval to proceed with their proposals. No leadership structure is imposed upon the groups. The quality of the group projects determines thirty percent (30%) of the final grade for this course. In this course, however, the students themselves list on their short papers the names of only those group members who the group agrees were active participants deserving of a grade for the project.

The above sections provided an initial 25 project groups, 18 groups of six each and three groups of five each from Psychology 3743, and two groups of eight and two groups of seven from Psychology 3413. The majority of student participants were non-psychology majors.

Under these circumstances, all elements were present for "real" group formation to occur, including two variables usually difficult to control for in "laboratory" research: (1) time for natural development of norms, roles, and status relationships, and (2) a "real" goal which is of personal value to the individuals, and which could not be attained by individual members, alone. In these respects, the above-described project-groups (teams) very closely approximate task-forces and project-teams formed in industrial settings. They also meet all other requirements, including size, to be considered to be "real groups" as defined here by both Sherif and Sherif (p. 5 and p. 9 here) and by James (pp. 12-13 here).

Identifying the Leader(s)

Since the membership of these research groups has been

determined by authority, i.e. by the instructor, there is no problem in identifying the groups, themselves, as there might be with "natural" groups.

Leadership within groups has been examined in a number of different ways. Lewin (1965) saw the nature of leadership in terms of autocratic/democratic group "atmospheres". French and Raven (1959) see leadership as a function of the five perceived power bases of: reward, coercive, referent, legitimate, and expert power. Fiedler (1967) sees leadership as being contingent upon both leadership "style" and the nature of the task.

This study looked at leadership as did Bales (1960), Sherif & Sherif (1969), and Stogdill (1974): in terms of "effective initiative" (see p. 7) and identified group leadership rankings by use of a sociogram (Moreno, 1953; MacNeil, Davis & Pace, 1975) which group members completed individually, late in their semester (see Appendix A). The sociogram is an effective instrument for identifying the individual(s) within each group who are perceived by the other members as being most effective and most competent in contributing to group functioning, as would be predicted by Exchange Theory (Thibault & Kelly, 1959; Blau, 1968; Shaw, 1971). The sociogram also contained an innovative "potency" dimension which was quantifiable for statistical treatment to compare leadership strength both within groups and between groups.

In addition to the sociogram identifying the group

leader as a function of "effective initiative", this "potency" dimension also allowed measurement of how much "effective initiative", relative to all other group members, is attributed to each group member by all other group members.

Measuring Leader Influence

A forced-choice questionnaire titled "The Fall-Out Shelter Problem" (Simon, Howe & Kirschenmaum, 1972) was given to all participants before any groups were formed (see Appendix B). This problem is frequently used in "values clarification" sessions, and requires the participant to select six people out of ten who will then be allowed entry into a bomb shelter during a time of crisis. The problem's selection procedure has been modified for the purpose of this study. In addition to selecting the individuals to be allowed entry, those selected individuals must also be ranked by order of preference. This ranking allows measurement both of different selections between group members, and if taken more than once, of the change of selection order of any group member(s) over time. This, then, will be a measurement of the amount of change experienced between each individual's initial ranking, and the final, unanimous ranking made by their own group. It was expected that the "leader(s)" would change the least, and "lower status" group members would change the most.

Research Hypotheses

On the basis of the cited research and within the

dimensions of the operational definitions presented, the following hypotheses were advanced:

Hypothesis One: There will be a strong positive relationship between assessed leadership strength as measured by the combined ranking and potency dimensions (item Number One), and cohesiveness as measured by the "liking of the group" (item Number Five) of the sociogram (Appendix A), i.e. the stronger the leader, the more cohesive the group.

Hypothesis Two: Within each work-group, the group-produced "solution" will show a significant inverse relationship between identification of an individual as being group leader (as measured by the combined ranking and potency dimensions of the sociogram), and the amount of change by those emergent group leaders from their initial problem-solution "rankings" and toward the initial rankings of the lower-status members, i.e. within each group, the leader will change the least when the group comes to a unanimous solution to the problem.

Hypothesis Three: There will be a significant inverse relationship between a group's relative cohesiveness score and the relative time taken for the group to complete the task, i.e. the more cohesive the group, the less time it will take to complete the task.

CHAPTER III

METHOD

Operation One

Experimental Groups

Students enrolled in Psychology 3413 and the two "grouping" sections of Psychology 3743 for the Spring term 1981 were assigned to work groups randomly, and balanced by sex. This assignment resulted in a total of 25 collections of people: two collections each of seven and of eight in Psychology 3413, and 18 collections of six and three of five in Psychology 3743 (see Table I).

Each of these classes was visited for the first time by the experimenter during the second week of classes, which was before the students' work-group assignments were announced. Each class was then told by the experimenter:

I am doing research on the decisions that people make during times of crisis. Dr. _____ has been kind enough to allow me to visit your class today and take a few minutes to give you the opportunity to participate in this project. I would like to stress that participation here is strictly voluntary, that your course grade is in no way involved, and if you do participate, that you may change your mind and quit at any time. You will notice that I have requested your name on the answer sheet. This is because I may have to come back to you later in this semester. And if I do have to come back, then I will need some way of identifying you. But

your name will be treated confidentially; I am the only person who will see your answer sheet.

I will pass out discriptions of the problem and answer sheets. Please do not discuss the problem with anyone before everyone in the class has finished. The problem sheet includes instructions on how you should proceed, but should you have any question, please raise your hand and ask me.

It was also made clear to these students that there was to be no "payment" in the form of grade credits, or any other kind of reward, for their participation.

Control Groups

As a control mechanism, in addition to the described 25 work-groups, students were recruited from the one remaining section of Psychology 3743. This section did not group its students. The data from this class was collected outside of the classroom and on the students' "own" time, as is frequently done in the OSU Department of Psychology. The instructor read a short prepared statement:

In exchange for one extra-credit point in this class, students are encouraged to participate in a study being conducted on decision making during times of crisis. This will be a paper and pencil exercise which will take about one-half hour of your time and which is not associated with classwork in this course in any way. Will those of you who are interested please sign the circulating sign-up sheet and take the tear-off tab with the room number that shows your particular time to report.

Students from this class were given the same introduction by the experimenter as the other three sections, except the second sentence was deleted and it was made clear that they could quit at any time while still receiving their

credit for participating.

Sufficient students were recruited to allow the formation of seven "pseudo-groups" of six members each, randomly assigned and balanced by sex. That they were a part of a "psuedo-group" was unknown to all participants. This step was accomplished to supply a baseline for later comparison to determine whether individuals would change their rankings over time. If there was a confounding influence from the participants having just completed an (undergraduate) upper-level course in social psychology, or as a function of time, or both, it would be identified within these "pseudo-groups".

General

The Fall-Out Shelter Problem (Appendix B) and the (first) answer sheet (Appendix C) were given to all participants. All printed materials for this first session had been type-written on ditto-masters and run off with purple ink, a style which would be changed for Operation Three.

Operation Two

Sociograms

Sociograms (Appendix A) were given to all subjects in the three "grouping" classes on the ninth week of the semester. The sociograms were administered to the students in Psychology 3743 as part of their coursework by the instructor, and to the students in Psychology 3413 by a confederate who stated:

I am involved with a research project on the make-up of groups.

Since you have been working in groups since the beginning of the semester, Dr. _____ has been gracious enough to invite me to come here today and request your assistance.

Your participation is voluntary, and your answers will not be seen by either Dr. _____ or by any other members of either your group or your class.

Please just follow the instructions provided for each item. If there are fewer people in your group than there is room for, that is fine. I wanted to be sure the form had enough room.

You may hand me your forms as you leave, and thank you for helping.

There was no connection between the sociogram and the data being collected by the experimenter in any of the classes.

The "control" class of the non-grouping section of Psychology 3743 was not involved this operation.

Operation Three

Experimental Groups

The experimenter returned to each of the three "grouped" sections on the thirteenth week of classes. Each class was told:

I have another part of the study on which you helped me before, and Dr. _____ has been generous in inviting me to come back to your class today.

If any of you are not now seated with your group members, will you please move so all members of each group are seated together.

I am now passing you each another copy of the Fallout-Shelter Problem. You will probably recognize it; it is virtually the same as the one you took eleven weeks ago. Please read it again to re-familiarize yourself with it. And you may write on your copy this time if you wish.

How many of you have not done this before? If you were not present when I

brought this here before, I will have some special instructions for you.

I am now passing out a single answer sheet to each group. Please do not write on it yet; I have some instructions to give you before you make any marks on it.

First, I want you to complete the name section on your group's single answer sheet. Everyone here should make certain that your own name is included. Your name should be written in whether you did this problem before or not. If you did not participate before, write in your name and place a star behind it. Those who did this problem before will not have a star behind their name. If any group members are absent today, do not write in their names. The section should contain only the names of all of your group members who are here right now, and with stars behind the names of those members who have not done this problem before.

Please write in your class-assigned group number (or letter) and today's date.

Would those of you who have not done this before please come over here.

Now, the group members still seated together should read the problem which contains its own instructions. You will be on your own. But remember - to be successful, your solution must be agreed to by everyone in your group within one-half hour. You may not be able to reach a unanimous decision. That is alright, too.

Someone should bring the sheet to me just as soon as you are finished. Please start now, and do the best that you can. And as before, if you have any questions, please ask me. (Make a note of the time)

See Appendix D for the revised answer sheet. There were no individuals present in any of the three "grouped" sections that had not already completed the exercise as individuals. If there had been, they would have been given the problem to do alone as "busy work", both removed from and to prevent them from interacting with their groups. In this case, their data would have been excluded from the analysis.

The time, correct to one-half of a minute, was covertly recorded for how long it had taken each group to complete the exercise.

Control Groups

The "control" class of the non-grouping section of Psychology 3743 was involved in Operation Three, but differently from the above description. The instructor in that class again read them a short statement:

I need the same people who participated in the "Fallout-Shelter Problem" about ten weeks ago to come back and help me again.

You will, of course, receive one more extra-credit point in your class, and the time involved will again be about one-half hour.

For those of you who are not sure if you participated, I have supplied a list of names with the sign-up sheets. Please check to see if your name is on the list. If it is (meaning that you had participated before), please write in a day and a time next to your name, and tear off the tab with the room number. The room is the same one as before, and the days and times available are on the top of the sign-up sheet.

If you participated in the initial part of this study, I need your help. I am hoping to see all of you. Thank you in advance for your assistance.

These participants, instead of having to arrive at a unanimous ranking solution with other people, were given the same ranking problem to complete as they had the first time. The participants were told by the experimenter:

There has been a problem with the analysis of the data which I collected eleven weeks ago. As I told you then, I needed your names in case I might have to come back to see you again. And that is exactly what has happened.

I have another problem for you to complete which will appear to be familiar to

you. It is similar to the one which you completed last time. How you ranked the people the last time is of no consequence to what we will be doing here today. I cannot use what you did the other time for what we are doing here now, today. Please consider this as being the first time that you have seen a problem of this sort, read the problem, and follow the instructions just as you did for the last one. If you have any questions, please ask me.

Both the "problem" and the answer sheet were computer-printed for all participants in Operation Three, which gave them a different appearance from those used in Operation One. The "problem" was identical for all participants in both Operation One and Operation Three, as was the answer sheet for the "control" section of Psychology 3743. The only difference in forms was the format of the second answer sheet for the "grouped" sections, which requested the names of all participating group members, and which also was computer-printed.

CHAPTER IV

RESULTS

On the basis of all participants in Operation One, a three-digit code was devised to facilitate identification of all participants in the project.

Each work-group and "pseudo-group" was assigned a code number. Numbers of 1 through 25 were assigned to the work-groups supplied by Psychology 3743, numbers 31 through 34 were assigned to the work-groups supplied by Psychology 3413, and numbers 41 through 47 were assigned to the "pseudo-groups" formed from the individuals recruited from the "non-grouping" section of Psychology 3743. Additionally, each person within each group was assigned a number. The range of these numbers was from "one" to whatever was the size of their group. Additional coding was included to identify both the age and the sex of each participant.

During the eleven weeks separating Operation One and Operation Three, a number of students were "lost" due to their dropping the course. More students were "lost" by their not participating in their group's solution to Operation Three. Of the initial 25 work-groups and 7 "psuedo-groups", 21 work-groups and all 7 "psuedo-groups" supplied

data for analysis from Operation One through Operation Three. All four of the groups which were dropped were from one large section of Psychology 3743 which placed the students into "real" work-groups. Those four groups did not participate in Operation Three because there were two or fewer group members present at the time. Of the 21 work-groups which completed the project and are included in the analysis, the sociometrically-identified group leader was present during Operation Three in every case. There was no leadership concern with the seven "psuedo-groups".

Initial and final group membership data is summarized in Table I on the following page.

All computer-generated calculations were accomplished with the use of an IBM System 370 Model 168 Mod 3 computer equipped with a SAS software package (Helwig & Council, 1979), and with a Texas Instruments "TI-55" hand calculator for the factorials in the "Fisher Exact Probability Test" which is not contained within the SAS package.

Measures of Groupness

Group Variability

The individual rankings from the Operation One "Fall-out-Shelter Problem" were coded as follows: the number corresponding to their rank position (1 through 6) was assigned to each of the six "persons" selected to enter the fall-out

TABLE I
GROUP MEMBERSHIP DATA

Initial Work-Group Membership of Groups Beginning the Project		Final Work-Group Membership of Groups Completing the Project	
<u>Number of Work Groups</u>	<u>Number of Members</u>	<u>Number of Work Groups</u>	<u>Number of Members</u>
-	-	1	3 = 3
-	-	3	4 = 12
3	5 = 15	6	5 = 30
18	6 = 108	8	6 = 48
2	7 = 14	1	7 = 7
<u>2</u>	8 = <u>16</u>	<u>2</u>	8 = <u>16</u>
25	153	21	116

Initial "Pseudo-Group" Membership of Students Beginning the Project		Final "Pseudo-Group" Membership of Students Completing the Project	
<u>Number of Pseudo-Groups</u>	<u>Number of Members</u>	<u>Number of Psuedo-Groups</u>	<u>Number of Members</u>
-	-	1	3 = 3
-	-	4	4 = 16
-	-	1	5 = 5
<u>7</u>	6 = <u>42</u>	<u>1</u>	6 = <u>6</u>
7	42	7	30

total group n = 32

shelter. The four "persons" not selected were assigned a value of eight.

An example of the method used to code the data follows in Table II.

TABLE II
SAMPLE PROBLEM "SOLUTION"

Excerpt from "Problem Sheet" (Appendix B)	Sample Solution From Answer Sheet (Appendix C)	Coding of Data
a. Bookkeeper . . .	1. (b)	a. = 5
b. His wife	2. (c)	b. = 1
c. Male black . . .	3. (e)	c. = 2
d. Female historian . . .	4. (g)	d. = 8
e. Male bio-chemist . . .	5. (a)	e. = 3
f. Rabbi or	6. (h)	f. = 8
g. Female olympic.		g. = 4
h. College coed		h. = 6
i. Policeman with		i. = 8
j. Female actress		j. = 8

The coded values for "a" through "j" were then used to determine how variable was each collection of people before any of the group formations were announced. This was accomplished by comparing each individual with each other indi-

vidual who had been assigned to their group, item by item. The difference between each item from "a" through "j" was determined, that value was squared, and all squared values were then added up. This sum of the squared differences was computed between all individuals within each group, and those sums were then summed. The mean of the summed-summed differences squared was then calculated to arrive at a value to represent how close (or far away) the participants who would be later assigned to the same groups were, on the average, from each other with their initial, individual solutions (Osgood, Suci & Tannebaum, 1957).

TABLE III
 MEAN OF THE SUMS OF THE SUMS OF THE DIFFERENCES,
 SQUARED, BETWEEN ALL INDIVIDUALS
 IN GROUP O1

Matrix						
Group Member Number:	1	2	3	4	5	6
1	0	58	144	94	96	78
2		0	100	90	146	60
3			0	150	148	108
4				0	88	50
5					0	74
6						0

total = 1484; mean = 98.93

The above mean of 98.93 may now be used as a measure of the initial variability of the members of group "01" to compare, relatively, how divergent the members of group "01" are compared to all other groups. This calculation was performed for all 32 groups.

The means of the summed-summed differences squared for the initial 25 work-groups had a mean of 92.96 with a range of 60.74 (62.93 to 123.67) and a SD of 17.13. The means of the summed-summed differences squared for the seven "pseudo-groups" had a mean on 90.80 with a range of 44.14 (76.13 to 120.27) and a SD of 17.74. A t-test on the means resulted in $t = 1.20$. There is no statistical difference between the work-groups and the "pseudo-groups" at the .10 level. Both the experimental and the control groups may be considered to have come from the same population for the initial group divergence data.

Sociogram Data

After allowing sufficient time for interaction and group characteristics to develop (10 weeks), the sociogram was administered (Appendix A). Each person within each group was assigned values for the rankings on sociogram item Number One which were given to them by all members of their group (including themselves). Each rank of "first" was given a value of "4", rank of "second" was given "3", rank of "third" was given "2", and all rankings below "third" were given "1". As used by Moreno (1953) and MacNeil et. al. (1975), the mean of this dimension of sociogram item

Number One is the basic criteria for group leadership identification. The individual with the highest mean score for "effective initiative" within the group is perceived as most being the leader by all group members.

The potency dimension of item Number One in this study is an innovative addition to the sociogram. This potency dimension is a relatively unstructured measure of the amount of "effective initiative" exhibited by each member. The hash-mark indicating how much "effective initiative" is quantified by segmenting the possible range into ten equal units, and then measuring from the end-point of "not at all", with "very much" having a maximum value of ten. The mean of these measured values for each individual is then added to their ranking mean for a value to represent their over-all leadership strength relative to all other individuals within their work-groups. The correlation between the related potency dimension values and the ranking values across all individuals ($r = .67$) was significant at the .0001 level (see Table V).

One "leader" was identified in each group by looking first at their ranking value as the basic criterion for selection as leader, and then to their potency value to adjust or "fine-tune" the over-all strength of their leadership position.

The combination of ranking and potency dimensions has a possible range of 1 to 14. A comparison of those individuals identified as being the group leaders with all individu-

als completing Operation One through Operation Three yields the results in Table IV.

TABLE IV
COMBINED RANKING AND POTENCY "LEADERSHIP" VALUES
FOR INDIVIDUALS COMPLETING OPERATION ONE
THROUGH OPERATION THREE

	Range	Mean	SD
Work-Group Leaders Only, n = 21	10.58 to 13.50	11.98	.86
All Individual Work Group Members, n 116	2.00 to 13.50	9.11	2.45

As expected from the method used for leader identification, for those individuals identified as being group leaders, the data reflects a distribution of leadership values with very little variation and greatly skewed toward the high scores.

The individual selected to be "leader" for the purpose of this research was always that person within each group who had the highest ranking score. In all groups but group #34, that individual also had the highest combined ranking and potency score. In group #34, that person was second, which is unexplained. Perhaps in this group the individual identified by the ranking dimension as being in second place

was much more enthusiastic in endorsing the suggestions made by the leader than was the leader himself in selling them.

Cohesiveness of each group was measured by item Number Five of the sociogram. This is the "affect" dimension, and was obtained by computing the mean of the hash-mark distances above "not at all" as indicated by all group members on a possible scale of 1-20. The procedure for doing this is identical as for the potency dimension, but with a greater possible range. This mean value of the hash-mark distances then becomes the group's relative cohesiveness score. The actual range of group cohesiveness scores for the 21 work-groups was 9.4 (from 9.40 to 18.80), with a mean of 15.61 and a SD of 2.67.

The sociogram items 2, 3, 4, and 6 were "filler" items and not used in the analysis.

Analysis of Hypothesis One

Hypothesis One states that the stronger is the group's leader, the more cohesive the group will be. To first get an over-all value for the relationship of each person's leadership strength (all group members) with the cohesiveness value for each of their groups, a Pearson product-moment correlation was calculated between all individual combined ranking and potency values, and the cohesiveness value of their group ($r = .14896$, $p = .11$). This across-groups value was not significant at the .10 level.

To directly test the hypothesis, a Pearson product-moment correlation was calculated between only the work-group

leaders' combined ranking and potency values, and the cohesiveness value of their group ($r = .40623$, $p = .07$). Hypothesis One was not supported at the .05 level of significance.

TABLE V
PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS
ACROSS GROUPS FOR LEADERSHIP STRENGTH
AND GROUP COHESIVENESS

	Leader Potency Value	Group Cohesiveness
Leader Ranking Value	.67	.27
Leader Ranking + Potency		.41*
Over-All Ranking + Potency		.15

Note. $n = 21$
* $p < .07$

Leadership and Change

Operation Three produced 21 work-group solutions to "The Fall-Out Shelter Problem", plus a second set of individual "ranking solutions" from the persons which were randomly assigned to the seven "pseudo-groups".

Another sum of the differences, squared and added up (see Table II) was computed for each individual. But this time, the differences were between what had been each per-

son's first and second ranking solutions. For the 21 work-groups, this step disclosed how far each person moved relative to each other person within their work-group while coming to a unanimous agreement for a common group "solution". For the individuals which were assigned to the seven "pseudo-groups", this step identified how much individual movement occurred as a function of time between their own first and second solutions.

The mean movement was calculated for each work-group and for each "pseudo-group", with the following results.

TABLE VI
INDIVIDUAL MOVEMENT WITHIN GROUPS FROM
OPERATION ONE TO OPERATION THREE

	Range of the Means	Mean of the Means	SD
Work-Groups, n = 21	48.50 to 111.66	68.46	16.91
Pseudo-Groups, n = 7	26.50 to 55.00	36.63	5.74

$t = 24.97; p < .001$

It can be seen that the work-groups and the "pseudo-groups" are significantly different in terms of "movement" of their members' solutions between Operation One and Operation Three.

Analysis of Hypothesis Two

Hypothesis Two states that within each group, the leader will change least of all group members. The significance level of the above t-test has established that the amount of movement within the work-groups is considerably more than would be expected to occur for individuals as a function of time alone.

The amount of movement for each sociometrically-identified leader was then compared with that of each other member within their group. Of the 21 work-group leaders, only six leaders were the group member which moved absolutely the least. Six other work-group leaders were the group member which changed absolutely the most. The remaining nine work-group leaders fell somewhere between the two intra-group extremes of the absolute most and the absolute least amount of movement.

To bring the resulting three "cells" up to values high enough to test the hypothesis, the leaders were sorted into categories of either having moved more than the average group members' movements within their own groups, or having moved less than the average group members' movements within their own groups. A one-sample chi-square test was then performed on the resulting 1x2 matrix (Jaynes, 1981).

TABLE VII
 AMOUNT OF LEADER CHANGE RELATIVE
 TO OTHER MEMBERS OF THEIR
 OWN GROUP

Amount of Leader Change (absolute)		Group ID Number
Most	4, 9, 12, 18, 21, 32 (6)	Most
Inter- mediate	1, 5, 6, 14, 19, 20, 31, 33, 34 (9)	Least
Least	2, 3, 11, 15, 16, 17 (6)	

=

Most	1, 4, 9, 12, 14, 18, 19, 20, 21, 32 (10)
Least	2, 3, 5, 6, 11, 15, 16, 17, 31, 33, 34 (11)

p > .80

Chi-square = .0476; with 1 df, $p > .80$. Hypothesis two was not supported.

Analysis of Hypothesis Three

Hypothesis Three states that the more cohesive is the group, the less time it will take for the group to complete the task.

The time taken by each of the 21 work-groups to complete Operation Three had been covertly recorded by the experimenter. A Pearson product-moment correlation was calculated between "time to complete the task" and "group cohesiveness" as measured by the affect dimension (Item Five) of the sociogram (see Appendix A): $r = .05502$, $p = .81$. The hypothesis was not supported.

Further Analysis of Data

The mean movements of the 21 work-groups (Table VI) were sorted to form group categories of "high" and "low". This sorting identified whether a group's members, on the average, moved more from their original ranking solution than did most of the other groups, or whether they moved less. This procedure created a 2x3 matrix for 21 work-groups with cell values again too low for statistical analysis (see Table VIII). The data was then further collapsed to shift the "intermediate" movement group leaders into either of the categories formerly occupied only by the leaders who moved either absolutely the most or absolutely the least within their groups. This procedure created a 2x2 matrix which could then be tested with a Fisher's Exact Probability Test (Jaynes, 1981). If significance was found in the more conservative "collapsed" matrix (which was expected to load in cells "b" and "c"), then the original matrix could be assumed to also be significant.

The breakdown of the individual groups is presented in Table VIII, which follows.

TABLE VIII
 CATEGORIES OF HIGH AND LOW-MOVEMENT
 RELATIVE TO AMOUNT OF
 LEADER CHANGE

Amount of Leader Change (absolute)		Movement of Individual Group Members vs. Their Own Group's Unanimous Solution			
	Low	High		Low	High
Most	4,9,18 (3)	12,21,32 (3)	=	1,4,9,18,20 (5)	12,14,19,21,32 (5)
	1,5,20,31,33 (5)	6,14,19,34 (4)		2,5,11,16,31,33 (6)	3,6,15,17,34 (5)
Least	2,11,16 (3)	3,15,17 (3)			

exact p = .59

As can be seen by the exact probability of the 2x2 matrix, there is no significant relationship between the amount of leader movement and the over-all movement within their respective groups.

The initial rankings of all of the 195 individuals par-

ticipating in Operation One were then tabulated to determine which selections, overall, were the most ranked in what order (were most popular). The 21 group-consensus rankings from Operation Three were then tabulated in the same way. These two procedures provided the following data, with values of "8" indicating those "persons" which were denied entry into "the fallout-shelter" (Table IX).

TABLE IX
OVER-ALL ORDERS OF PREFERENCE
FOR FALL-OUT SHELTER
PROBLEM

	A	B	C	D	E	F	G	H	I	J
Individual Rankings, Operation One*	5	1	2	8	3	8	4	6	8	8
Unanimous Rankings, Operation Three**	4	1	3	8	2	8	5	6	8	8

Note. "8" = not selected

*n = 195

**n = 21

The initial rankings of the work-group leaders were then compared with the "unanimous group rankings" above, again using the sum of the differences, squared, method. Another 2x3 matrix was constructed, this time examining the group leaders' relative positions with the above unanimous group "normative" solution (Table X).

TABLE X
 COMPARISON OF GROUP LEADER RANKINGS WITH
 "NORMATIVE" GROUP SOLUTION

	Amount of Leader Change (absolute)		Leader Divergence From Group "Normative Solution"	
	Low	High	Low	High
Most	0	4, 9, 12, 18, 21, 32 (6)	1, 14 (2)	4, 9, 12, 18, 19, 20, 21, 32 (8)
Inter- mediate	1, 5, 14, 33, 34 (5)	6, 19, 20, 31 (4)	2, 3, 5, 11, 15, 16, 17, 33, 34 (9)	6, 31 (2)
Least	2, 3, 11, 15, 16, 17 (6)	0		

exact p = .0073

After reducing the data to a 2x2 matrix, the Fisher's Exact Probability Test shows $p = .0073$. This suggests that, among the group leaders, those work-group leaders which changed the most were also the most divergent from the over-all group "normative" solution, and those who changed

the least were the least divergent. This same comparison with the over-all individual "normative" solution yields exact $p = .02$.

The relationship in Table X was then compared with the initial relative variability (divergence) of the groups. The relationship between these three variables, plus the sex of the informal group leader, is summarized in Table XI.

TABLE XI

SEX OF THE WORK-GROUP LEADER AS A CONSIDERATION IN THE COMPARISON OF LEADER CHANGE, LEADER DIVERGENCE FROM THE GROUP "NORMATIVE" SOLUTION, AND INITIAL GROUP DIVERGENCE

Leader Divergence from "Normative" Solution		Low	Low	High	High
		High	Low	High	Low
Amount of Leader Change (absolute)	Most	0	0	F,M (2)	F,M,M,M (4)
	Inter- mediate	F (1)	F,F,F (3)	F,F,F,M (4)	M (1)
	Least	F,F,F,F (4)	F,M (2)	0	0

The over-all male/female sex ratio of the 21 work-group

leaders was that seven were males and fourteen were females.

As shown in Table XI, the six leaders who changed more than anyone else within their own work-groups were all farther than the average from the group "normative" solution (see above and 2x3 matrix in Table X). Four of those leaders were in groups which were very close together (tight consensus) from the beginning (see Table III for example). Four of the six leaders who moved the absolute most were males.

The six leaders who changed less than any other person within their own work-groups were all closer than the average to the "normative" solution. Four of those leaders were in groups which were very divergent (loose consensus) from the beginning, and five of the six leaders who moved the absolute least were females.

CHAPTER V

DISCUSSION AND SUMMARY

The functioning of groups is a complex phenomenon which may be examined at both the individual and the inter-personal levels of analysis. Decision-making within groups is but one component of group functioning, and at the same time is, itself, a complex phenomenon. That group structure emerges among persons who interact over time while pursuing a common goal (either personal or "formal") is known. And the amount of influence of any one individual upon what emerges as a unanimous group decision may be beneath the threshold of awareness of even the individuals who are directly involved. A method to both identify the source of a group's "guiding influence" and to predict the impact of that influence upon the decisions made by the group may be of interest to those who utilize groups in a decision-making capacity. The search for the variables for measurement to accomplish this identification, and their influence, underlies the hypotheses which were tested.

Discussion

The Fall-Out Shelter Problem

The Fall-Out Shelter Problem was adequate as it was

employed. The "problem" is frequently used in "values clarification" sessions, and its answers are drawn from both the personal values and from the social norms of the individuals involved. The required ranking of the selections of "people" to be "saved" was an innovative modification of the original problem. The ranking both makes a "solution" more difficult, and it improves quantification of the data for comparisons of both individuals and of groups over time.

Measures of Leadership

The "effective initiative" dimension has been shown to be an accurate variable for leadership identification once sufficient interaction has occurred for status relationships to have emerged and become stable (Sherif & Sherif, 1969). The "potency" factor was the only innovation which was introduced to the standard sociometric measurement of effective initiative within groups. The addition of the potency factor to compliment the effective initiative ranking value appears to be useful. The leader is still primarily identified by their ranking value.

In 1 case out of 21 the combination of the two factors identified another person within the group as being the leader (with the "ranking" leader shown as second), and in two other cases it created a tie for the group leader position. But the ranking value is always looked at first for leadership identification, so this is not a problem.

In two other cases, there were ranking-value ties for the leadership position. In this case, the potency factor

may be useful as a "tie-breaker" to identify the group leader and the relative positions of other group members.

Measures of Groupness

Cohesiveness refers to the force holding the group together, i.e. the attractiveness of the group to its members. It was expected that high cohesiveness would be inversely related to the time required for a group to come to agreement on a problem (Sherif & Sherif, 1969).

The use of the single question to measure how much the group is "liked" by its members may have been inadequate here. There is close to zero correlation ($r = .06$) with time taken to complete the task.

However, aside from the one-half hour time limit placed as a maximum upon the group within which to resolve their problem successfully, there was no incentive or pressure for them to proceed quickly. There was also no competition between groups. The procedure then was a test only of whether or not a more highly-cohesive group would, without encouragement to proceed as quickly as possible, reach agreement more quickly than a group which is less cohesive.

The four work-groups which were required to come to agreement on bi-weekly classroom examinations were: (1) among the groups which had the highest cohesiveness values, and (2) their times to complete the problem were either tied or beaten by 7 of the 17 work-groups which were required only to work together on projects. It seems illogical that the groups most "practiced" in coming to agreement on

answers to problems would take longer than 41% of the project work-groups. But a possible explanation here may have been, that in addition to the lack of real pressure to finish as quickly as possible, it may also have been normative for those groups to discuss their consensual problems in greater detail.

Cohesiveness as measured here is also not related to the relative strength of the group's leader as compared to other groups and their leaders. But the groups which made up this study were work groups, and not the self-selected informal groups of people which are referred to as "friendships". In this case, effective initiative means seeing that the job is done well for the (academic) benefit of all group members. This suggests that, in an unstructured work-group situation, the individual who is perceived to be best-equipped to get the job done will emerge as the leader, and that the members' "liking" of the group is unrelated to the perceived strength of that group leader's (successful) "effective initiative".

Influence of the Group Leader

The method of measuring the movement of each individual from their initial problem solution to the consensual problem solution appears to be adequate. And the method of establishing the initial divergence (lack of agreement between group members) also appears to be adequate.

The results suggest that the influence of the work-group leader on group consensual decisions is no more than

by chance: groups did move to the initial solutions of 6 of the 21 leaders, but 6 other leaders moved more than anyone else within their group, and the 9 other leaders fell somewhere between those extremes. This could perhaps be explained by theories of autocratic/democratic, etc. leadership "styles", by "atmospheres", by types of "power", or challenged on the grounds that the problem to be solved was not "real" and that the quality of its solution had no utility for the participants.

Further analysis of the data as shown in Table IX and Table X, however, presents a picture which is more complex than which could be explained by one "style" of leadership. This analysis also weakens the "lack of utility" explanation.

Table IX is overwhelming in its display of what may be considered to be socially-normative answers to the problem. Some individuals who emerged as group leaders were closer to those normative answers when they completed the problem as individuals during Operation One than were others who later emerged as group leaders.

It could simply be stated that the group members moved to the social norm when they were required to come to a consensual solution for the problem to be successfully completed; this is what Table IX clearly shows. But to limit the analysis to that would be to ignore the leadership issue entirely. If the leader has no influence, why is that person perceived by all of the group members as initiating the

most suggestions which are subsequently carried out by the group?

Table X shows the movement of the group leaders from the perspective of their initial agreement (or divergence) from the socially-normative group solution. This data shows that 12 of the 21 group leaders (57%) either knew the social norms from the very beginning, or were willing to move more than everyone else in their group to get there.

The leaders who moved the least of everyone within their own group were those who were close to the socially-normative solution from the beginning and were in groups which were highly divergent. The leaders who moved the most were themselves far from the socially-normative solution at the beginning, and were in groups which were fairly "tight". This interpretation would be supported by "Adept Leadership Theory" (Jaynes & MacNeil, 1981), which says that in this first case, the adept leader would show a great deal of structuring behavior in the decision-making process and bring the group members closer to the leader's position. In the second case, the adept leader is initially very far away, but would move to the group. In this last case, a good adept leader may actually sense the direction in which the group is moving and make it appear as though he/she was actually there first. The theory also contains adequate provisions to propose explanations for the "intermediate-change" group leaders.

It also appears that the female leaders were generally

closer to the socially-normative solution than were the male leaders, and that those who were the closest to that solution tended not to move away from that position.

Of the six work-group leaders which changed the most, four were males. Of the six work-group leaders who changed the least, five were females. The "interim" movement leaders were split, with two being male, and seven being female. Nine of the fourteen female leaders were closer to the normative solution with their first individual solution than were the rest of the leaders; six of the seven male leaders were farther from the normative solution with their first individual solution than were the rest of the leaders. There are obvious sex differences contained within the results.

Implications for Further Research

The methodology employed here, to the author's knowledge, has never before been used to examine the effects of interpersonal influence with respect to decision-making. Although none of the original hypotheses were supported at the .05 level of significance, further analysis of the data suggests that the interaction of (1) the sex of the individual, (2) the initial consensus (or divergence) of the group members, and (3) social (or organizational) norms may be predictive of the amount of influence a work-group leader will exercise during group decision-making tasks. Additional studies may also consider age as a variable. The mean age of the 195 participants in this study was 21.5420

years, $SD = 2.7152$; the median was 21, with $Q1 = 20$ and $Q3 = 22$ in a range of 18 to 48.

Summary

The two relevant statistically-significant findings in the research showed that: (1) the innovatively-introduced "potency" values in the sociogram were shown to be highly related to the leadership ranking values across all participants ($r = .67$, $p = .0001$; see Table V), which suggests that the addition of this dimension to a sociogram is a useful technique for breaking the inevitable "ties" which will occur for the first-place (leadership) position within a group, and (2) further analysis of the data suggests that the more initially divergent a work-group leader is from a socially-normative solution (or values), the more that leader will move toward the group consensus; the closer a work-group leader is to a socially-normative solution (or values), the less likely that leader is to move away from their original position (exact probability = $.0073$; see Table X).

The researcher's innovative use of "The Fall-Out Shelter Problem" as reported here, with its subsequent analysis, appears to be a potentially effective technique to successfully measure the differences in problem solutions both between individuals and within individuals over time, while at the same time providing the researcher with a reliable socially-normative base against which to compare both individual and group decisions.

With respect to the fundamental question of whether the decisions made by a project team or task force are the products of group interaction or whether an emergent leader will have disproportionate influence: the results suggest that the influence which a single individual (informal leader) within a work-group has upon the decisions which are made by that group is a function both of the distance of the work-group leader from the socially-normative solution, and of the degree of consensus (agreement) between the other group members when the problem is first presented and before it is discussed with the other members.

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APPENDIX A

SOCIOGRAM

Name _____

Group _____ Date _____

FOR EACH QUESTION, RANK YOUR ENTIRE GROUP

1. List in order, from most to least, the persons in your group who come up with ideas and suggestions that the group actually carries out. No ties. Include yourself.

Indicate with a slash mark across the line how much for each.

- | | very much | not at all |
|----------|-----------|------------|
| 1. _____ | { | _____} |
| 2. _____ | { | _____} |
| 3. _____ | { | _____} |
| 4. _____ | { | _____} |
| 5. _____ | { | _____} |
| 6. _____ | { | _____} |
| 7. _____ | { | _____} |
| 8. _____ | { | _____} |

2. List in order from most to least the persons in your group who do the most work toward group goals. No ties, and list yourself.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

3. List in order from most to least the persons with the best knowledge of the subject matter of the course material. No ties, and remember to list yourself.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

4. List in order from most to least the people that you like most in your group. No ties, and do not include yourself.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

5. Indicate with a slash mark how much you like your group.

very much { _____ } not at all

6. List below an ideal group. If you had your choice of anybody you wanted to be in your group (excluding faculty), who would you have in the group? Present members may be included or left out. list below everybody you would want in the group. No ties, and include yourself.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

APPENDIX B

THE FALL-OUT SHELTER PROBLEM

THE FALLOUT-SHELTER PROBLEM

Assume that all of the following is true. You can make no "changes" in the circumstances as they are presented here.

You are in charge of a department in Washington, D.C. that is responsible for experimental stations in the far outposts of civilization. Suddenly the Third World War breaks out and bombs begin dropping. Places all across the globe are being destroyed, and people are heading for whatever fallout shelters are available. You receive a desperate call from one of your experimental stations, asking for help.

It seems there are TEN people but there is only enough room for SIX people for a period of three months, which is how long they must stay down there to be safe. They realize that if they have to decide among themselves which six should go into the shelter, that they are likely to become irrational and begin fighting. So they have decided to call your department and leave the decision to you. They will abide by your decision.

But you must quickly get ready to try to save yourself, so all you have time for is to get superficial descriptions of the ten (10) people. You have a half-an-hour to make your decision, and then you will have to leave.

So you now have a half-hour to decide which four of the ten will have to be eliminated from the shelter. Before you begin, I want to impress upon you two important considerations: (1) It is entirely possible that the six people you choose to stay in the shelter may be the only six people left to start the human race over again. This choice is, therefore, very important. Try to make the best choices possible. (2) On the other hand, if you do not make a choice in a half-hour, then you are, in fact, choosing to let the ten people fight it out among themselves, with a high probability that more than four of them will perish. You now have exactly one half-hour. Rate your choices in descending order beginning with the one you consider to be most acceptable on the separate form supplied.

Here is all you know about the ten people:

- a. Bookkeeper; 31 years old
- b. His wife; six months pregnant
- c. Male black militant; second year medical student
- d. Famous female historian-author; 42 years old
- e. Male bio-chemist

(continued on next page)

- f. Rabbi or minister; 54 years old
- g. Female olympic athlete; all sports
- h. College co-ed
- i. Policeman with gun (they cannot be separated)
- j. Female actress, singer and dancer

APPENDIX C

ANSWER SHEET, OPERATION ONE

Name _____

Date _____

Sex (circle one) Male Female

Age _____

There is no "correct" solution to this problem.

Rank your choices by letter (a, b, c, etc.) in the spaces provided, with your first (most acceptable) choice on the top (No. 1).

Your name is required for identification to allow statistical analysis, only. The information on this form shall be totally confidential.

THE FALL-OUT SHELTER PROBLEM

MOST acceptable: 1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

APPENDIX D

ANSWER SHEET, OPERATION THREE

List each group member who is present at this time:

Date _____

Group Number _____

To be successful, you must unanimously agree as a group within one-half hour.

There is no "correct" solution to this problem.

Rank your choices by letter (a, b, c, etc.) in the spaces provided, with your first (most acceptable) choice on the top (No. 1).

Your name is required for identification to allow statistical analysis, only. The information on this form shall be totally confidential.

THE FALL-OUT SHELTER PROBLEM

- MOST acceptable: 1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

APPENDIX E
CONSOLIDATED DATA

Group Member	Rank Value	Potency Score	Units of Leader Diff. From 1st to Norm. Sol. (Tbl. IX)	Group Cohsiv.	Time to Complete (minutes)
Group 01:					
1	2.25	8.50		13.00	tie 5.5 (x)
2	2.25	8.50		13.00	tie 5.5 (x)
3	2.50	4.75		13.00	05.5
*4	3.25	7.50	42	13.00	05.5 (y)
Group 02:					
1	2.00	7.50		16.83	04.5
2	1.33	4.83		16.83	04.5
3	1.17	5.00		16.83	04.5
4	2.83	8.33		16.83	04.5 (y)
5	1.17	6.67		16.83	04.5
*6	3.50	9.16	30	16.83	04.5 (x)
Group 03:					
1	2.17	7.17		13.00	09.5
2	1.50	7.00		13.00	09.5
3	3.17	8.50		13.00	09.5
4	1.00	6.67		13.00	09.5 (y)
*5	3.17	8.67	52	13.00	09.5 (x)
6	1.00	5.67		13.00	09.5

Group 04:

1	2.00	9.00		18.60	05.0 (x)
2	1.60	9.20		18.60	05.0
*3	2.80	9.40	92	18.60	05.0 (y)
4	2.40	9.40		18.60	05.0
5	2.20	9.00		18.60	05.0

Group 05:

1	1.00	1.00		09.40	08.0
2	1.80	6.80		09.40	08.0
3	1.00	2.20		09.40	08.0 (x)
5	2.00	7.00		09.40	08.0 (y)
*6	2.00	8.80	26	09.40	08.0

Group 06:

1	5.20	8.00		17.40	04.5 (y)
*2	3.50	8.80	76	17.40	04.5
4	1.40	8.00		17.40	04.5 (x)
5	2.00	8.40		17.40	04.5

Group 09:

1	2.25	7.00		14.00	14.5 (x)
*2	3.25	8.00	128	14.00	14.5 (y)

4	2.00	6.75		14.00	14.5
6	2.50	7.25		14.00	14.5

Group 11:

*1	3.00	8.00	30	10.25	10.0 (x)
2	2.50	7.75		10.25	10.0 (y)
5	1.50	5.25		10.25	10.0

Group 12:

1	1.75	7.50		14.50	15.0
2	1.50	5.00		14.50	15.0
3	2.75	8.25		14.50	15.0
4	1.00	5.25		14.50	15.0 (x)
*5	4.00	8.75	118	14.50	15.0 (y)

Group 14:

*1	3.17	7.83	44	15.83	09.0
2	2.00	6.83		15.83	09.0
3	2.33	7.33		15.83	09.0
4	1.17	5.50		15.83	09.0 (x)
5	2.33	7.50		15.83	09.0
6	1.00	5.17		15.83	09.0 (y)

Group 15:

*1	3.40	8.40	16	18.20	14.5 (x)
2	1.00	1.00		18.20	14.5
3	1.40	7.60		18.20	14.5 (y)
4	3.00	8.20		18.20	14.5
5	2.00	8.00		18.20	14.5
6	1.00	6.80		18.20	14.5

Group 16:

*1	3.80	9.50	36	18.80	13.0 (x)
3	1.80	9.00		18.80	13.0
4	1.80	9.00		18.80	13.0 (y)
5	1.80	9.00		18.80	13.0
6	1.80	9.00		18.80	13.0

Group 17:

*1	4.00	9.17	14	17.67	11.5 (x)
2	2.67	8.67		17.67	11.5
3	1.00	4.17		17.67	11.5
4	1.50	6.17		17.67	11.5 (y)
5	1.50	6.33		17.67	11.5
6	1.44	6.67		17.67	11.5

Group 18:

1	2.17	7.33		13.67	03.5
2	2.00	7.17		13.67	03.5
3	1.67	6.83		13.67	03.5
4	1.17	2.80		13.67	03.5 (x)
*5	3.83	8.33	94	13.67	03.5 (y)
6	1.17	6.67		13.67	03.5

Group 19:

2	1.80	6.20		14.20	18.0
3	2.40	7.80		14.20	18.0 (x)
4	1.10	6.40		14.20	18.0
5	2.00	8.00		14.20	18.0 (y)
*6	3.60	8.60	76	14.20	18.0

Group 20:

2	1.00	1.33		14.50	04.0
*3	4.00	9.50	58	14.50	04.0
4	2.75	6.75		14.50	04.0 (x)
5	1.25	4.67		14.50	04.0 (y)
6	1.60	5.50		14.50	04.0

Group 21:

1	1.50	5.40		16.83	11.0 (x)
2	3.33	9.00		16.83	11.0
3	1.33	6.33		16.83	11.0
4	1.33	6.17		16.83	11.0
5	1.00	4.50		16.83	11.0
*6	3.50	8.83	52	16.83	11.0 (y)

Group 31:

1	1.00	2.86		18.86	11.0
2	1.88	8.43		18.86	11.0 (x)
3	1.50	8.00		18.86	11.0
4	1.38	8.60		18.86	11.0
5	1.88	7.71		18.86	11.0
6	1.00	7.00		18.86	11.0
*7	2.63	8.57	62	18.86	11.0
8	1.25	7.57		18.86	11.0 (y)

Group 32:

1	2.14	7.00		18.43	08.0 (y)
2	6.00	5.86		18.43	08.0
3	1.71	7.71		18.43	08.0
4	1.00	6.00		18.43	08.0
5	2.71	7.86		18.43	08.0 (x)
6	1.14	6.86		18.43	08.0

*7	3.29	8.57	72	18.43	08.0
----	------	------	----	-------	------

Group 33:

1	1.00	5.83		17.17	08.5
2	1.00	3.17		17.17	08.5
3	1.17	5.00		17.17	08.5 (y)
4	2.67	7.83		17.17	08.5 (x)
5	1.00	4.50		17.17	08.5
*6	3.50	9.33	22	17.17	08.5
7	1.00	2.33		17.17	08.5
8	2.67	8.00		17.17	08.5

Group 34:

1	1.17	6.75		16.67	13.0
*2	2.83	7.75	30	16.67	13.0
4	2.17	8.25		16.67	13.0 (x)
5	2.50	8.75		16.67	13.0
6	1.50	7.25		16.67	13.0 (y)
7	1.83	7.75		16.67	13.0

Mean =
3.3143

Mean =
7.0361

Mean =
15.610

Mean =
9.3810

SD =
.5053

SD =
1.8919

SD =
2.7395

SD =
4.2125

*identified group leader

(x) = least movement between individual and group rankings

(y) = most movement between individual and group rankings

VITA²

Robert Frank Fulton

Candidate for the Degree of
Master of Science

Thesis: THE INFLUENCE OF THE EMERGENT INFORMAL GROUP
LEADER ON UNANIMOUS GROUP DECISIONS

Major Field of Study: Psychology

Biographical:

Personal Data: Born in Hershey, Pennsylvania, June 21,
1942, the son of Mr. and Mrs. Frank T. Fulton.

Education: Graduated from Hershey High School,
Hershey, Pennsylvania, in May 1960; received an
Associate of Arts degree from Hershey Junior College
in 1963; attended York College of Pennsylvania,
York, from 1976-1977; attended Pennsylvania State
University, Middletown, from 1977-1979; received a
Bachelor of Science degree from the University of the
State of New York, Albany, in March, 1979; completed
requirements for the Master of Science degree at
Oklahoma State University in July, 1981.

Honors and Professional Experience: Elected to member-
ship in the Delta Tau Kappa international honor soci-
ety for the social sciences; Graduate Teaching
Assistant, Oklahoma State University, Department of
Psychology, 1979-81; Graduate Research Assistant,
Oklahoma State University, Department of Psychology,
1980.