AN EXAMINATION OF THE ROLE OF COMMUNICATION VARIABLES AND DECISION MAKING IN STRUCTURED PROBLEM SOLVING GROUPS

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". . . the doing matters more than the attainment . . ."

Peter Matthiessen, The Snow Leopard

For my faithful and loving friends and family,

in gratitude, affection and respect

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CHAPTER I

INTRODUCTION

The growing recognition that human resources are the key to productivity has lead to an increased awareness of the importance of small group problem solving. American industry in particular, is decentralizing, breaking down into manageable "chunks" or small groups of decision makers. More workers are involved in making decisions and solving problems rather than just a few people in the corporate hierarchy.

This involvement of more workers in the decision making process and in problem solving groups underlies the need for optimum problem solving and decision making guidelines. Bobele and Buchanan (1976) state that "the complexity of today's business environment creates increasing pressure on the organization and the manager's job. Better problem solving skills could help organizations survive and grow and, in addition, help the manager cope with his situation" (p. 255). Young (1980) agrees, "The group problem solving meeting is. . . an especially effective approach for solving complex novel problems which occur in organizational settings" (p. 3.).

One consequence of this involvement of more workers in problem solving is a proliferation of problem solving techniques and models. This, in turn, has led to an increasing emphasis on the importance of individual contributions to the group and the coincident need for more people to be well-versed in the varied approaches to problem solving and the communication processes inherent in them.

Toffler (1980) states that we are in the midst of the rise of a new civilization coming from the death of industrialism. Ferguson (1980) presents the same hypothesis substantiated with research and specifically cites trends that are occurring world-wide: old ways of thinking, dogmas, formulas--no longer work. We are developing new modes of communication, new life styles, new values and technologies, new ideas and analogies, classifications and concepts.

> Third Wave employers increasingly need . . . men and women who accept responsibility, who understand how their work dovetails with that of others, who can handle even larger tasks, who adapt swiftly to changed circumstances, and who are sensitively tuned in to the people around them (Ferguson, 1980, p. 401).

In other words, there is an increasing need for people who can solve problems creatively and at the same time effectively communicate with others.

In their book, In Search of Excellence, Peters and Waterman (1982) indicate an overall developing pattern. It seems that in the companies doing well financially, the emphasis is upon people: appealing to their inner motivations

and allowing them to be part of the organization but also helping them excel individually. Companies such as these are (1) ensuring employee participation in decisions that affect employee work environment; (2) encouraging a great deal of informal communication; (3) using ad hoc groups for solving problems; and (4) accomplishing more problem solving and decision making in small groups of people. Essentially, these organizational trends will result in involvement of more people in problem solving situations where effective relational communication is needed--people will need communication skills to be satisfied with the problem solving process. Easton (1971) cites a study that pinpoints the improvement of problem solving ability and communication skills as essential ingredients for enhancing organizational efficiency and effectiveness (pp. 1-2).

The interrelationship of this "new order" to problem solving and communication skills--especially the relational or interpersonal aspects of problem solving groups--seems assured. Practically and humanistically communication skills in problem solving situations are of vital importance.

The Study and Its Setting

The Nature of the Problem

Communication is basic to problem solving groups. Without communication, groups could not function--it is the means by which problems are discussed and resolved.

The manner in which group members communicate has been of concern to many scholars who acknowledge that a group must address the task or problem to be solved but at the same time deal with the manner in which group members communicate (Bales, 1953, pp. 142-3; Hare, 1976, p. 6; Collins & Guetzkow, 1964, p. 61). Steiner (1972) refers to the manner in which group members communicate as "group process" (pp. 8-9). Group process or the interpersonal communication between group members must allow for the effective resolution of the task at hand and at the same time meet the relationship or social and emotional needs of group members (Bales, 1953, pp. 142-3; Collins & Guetzkow, 1964, p. 61; Fisher, 1980, p. 67; Hare, 1976, p. 6; Hoffman, 1979, p. 188; Hoffman & Maier, 1964, p. 264; Tuckman, 1965, p. 385). Effective communication can lead to satisfaction with the quality of the solution (resolution of the task) and acceptance by group members with the decision (meeting social and emotional needs) (Carney, 1977, p. 8; Collins & Guetzkow, 1964, p. 60; Hoffman & Maier, 1967, p. 166). Within a problem solving group, these task and social dimensions of group interaction are--for all practical purposes--inseparable and interdependent,* and must be studied with that interdependency in mind (Fisher, 1980, p. 67). However, this fact does not preclude separating these two dimensions for analysis.

For group members to reach a high quality decision

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*Every verbal interaction has a content and a relationship dimension (Fisher, 1980, p. 100).

in terms of the objective facts of the problem and at the same time feel satisfied with the decision is difficult to achieve in problem solving situations (Van Gundy, 1981, p. 281; Hoffman & Maier, 1967, p. 175). Current formal structured problem solving methods* set forth the steps by which a group is conducted through the solution of a problem. However they do not adequately prescribe "how" to communicate during problem resolution that would lead to satisfaction with both the solution and the manner in which members communicated with each other (Pankowski, Schroeder & Jahns, 1973, p. 22 quoted from Newcomb, Turner & Converse, 1962, pp. 477-81; Van Gundy, 1981, p. 218).

This study aims to make clear what constitutes effective relational communication in structured problem solving groups and how research indicates effective relational communication can be achieved.

The Need for the Study

Task and relational components are equally important in problem solving groups (Bales, 1953, p. 142; Fisher, 1980, p. 38; Steiner, 1972, pp. 8-9). However, while task requirements are usually addressed by a problem solving

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*Structured problem solving is a formal, structured approach for solving non-routine types of problems. The majority of these approaches are based upon specific principles and assumptions about creative thinking and problem solving (Van Gundy, 1981, p. 2).

method, relational skills are not addressed or treated adequately. Thus, students of problem solving are left without adequate guidelines for how to achieve quality relational communication. An enigma remains for "the means of developing groups to attain a level of trust, openness, risk-taking and quality of communication adequate to fulfill their interaction and production responsibilities" (Watson, 1969, p. 431).

This neglect of relational skills, or interpersonal communication factors in group problem solving is well-documented. Nemiroff and King (1975, p. 1) and Grossman (1982, p. 62) call for further study to delineate communication skills necessary in group decision making. Other researchers support their findings and decry the lack of the study of the effects of communication variables on group decision making (Carney, 1977, p. 8; Hall & Watson, 1970, p. 299; John, 1953, p. 1; McGrath & Kravitz, 1982, p. 201; Rohrbaugh, 1979, p. 75; Stephenson, Michalsen & Franklin, 1982, p. 320). Isaksen (1983) cites the need for leaders of problem solving groups to have a knowledge of group process so group members can communicate more effectively and achieve greater satisfaction (p. 22).

The second justification for this study is the neglect of relational components of communication in current problem solving methods. Van Gundy (1981) argues that "most problem solving techniques have emphasized the development of task skills" to the neglect of interpersonal communication skills

p. 274). He concluded that all but two out of a total of seventy-five current problem solving methods, emphasized the development of task skills to the neglect of interpersonal skills (Van Gundy, 1981, p. 27)[1]. Further study of three popular problem solving methods* led this writer to agree that problem solving techniques do not adequately address the relational aspects of communication; that is, the social and emotional problems between people in problem solving groups.

Theoretical Rationale for the Study

Analysis of communication in a task group (problem solving group) reveals two simultaneous problems: task obstacles and interpersonal obstacles. Task obstacles are the difficulties group members must overcome when communicating directly about the problem. Interpersonal obstacles include communication directed toward group relationships, such as making oneself clear to others, dealing with conflict, maintaining cooperation, and so on (Littlejohn, 1983, p. 221).

The distinction between task and interpersonal relations has served as a convenient way to study other problem solving group communication. In actuality, these areas are interrelated and are inseparable in accomplishing a task and achieving satisfaction with the group process (Littlejohn,

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*Norminal Group Technique (Delbecq, Van de Ven & Gustafson, 1975); Kepner-Tregoe (Kepner & Gregoe, 1981, 1979); Creative Problem Solving (Noller, 1977).

1983, p. 221; Fisher, 1980, p. 39). One can fulfill both task and interpersonal functions with a single statement (i.e., information directed toward task and information directed about relationships) (Littlejohn, 1983, pp. 221-2).

Figure 1 (see page 10) is a useful model outlining the general components of the group decision making process. The model illustrates that a group's ability to utilize and integrate the individual skills and abilities of its members will affect individual and group productivity and satisfaction. When group resources are used to best advantage an "assembly effect" occurs in which the group product is superior to the individual work of the most capable member. Similarly, rewards for the group and the individual can be of a positive or negative nature. Successful solution achievement and successful interpersonal communication usually are positively rewarding. However, group outcomes can be evaluated negatively. Positive or negative, these evaluations in turn, affect future task and interpersonal efforts in the group, as indicated by the feedback arrows in the model.

The model in Figure 1 provides a means to illustrate how variables can affect problem solving group effectiveness and satisfaction with the group's manner of communication. For example, if by past experience a group member found that other members of the problem solving group could not be trusted to treat communication contributions with respect,

most likely the next contributions would be somewhat tempered or inhibited as a result of the negative previous experience. A positive experience would most likely encourage the continued and willing contribution of ideas.

Thus, the model by Collins and Guetzkow provides a theoretical construct through which factors that influence the communication process toward task and interpersonal obstacles may be discussed. The model also serves as a basis for establishing the qualities of an effective solution. An effective solution has positive rewards associated with the relational or process aspects of communication or how the group communicated. Second, an effective solution has positive rewards related to the quality of the solution or resolution of the task--satisfaction with the solution (Hoffman & Maier, 1967, p. 175; Hoffman & Maier, 1965, 1964).

An effective solution is dependent upon the group communication process--"its ability to question, clarify, challenge, support, synthesize or summarize . . . at appropriate intervals" (Watson, 1969, p. 431). In addition to providing rewards for the individual and the group, research stresses the importance of involving group members in the decision making process if they are to be committed to carrying out the group decision (Watson, 1969, p. 431; Hoffman & Maier, 1965, p. 386). This participative decision making, involving full commitment and involvement of group members will result more often in group effectiveness and satisfaction when full attention

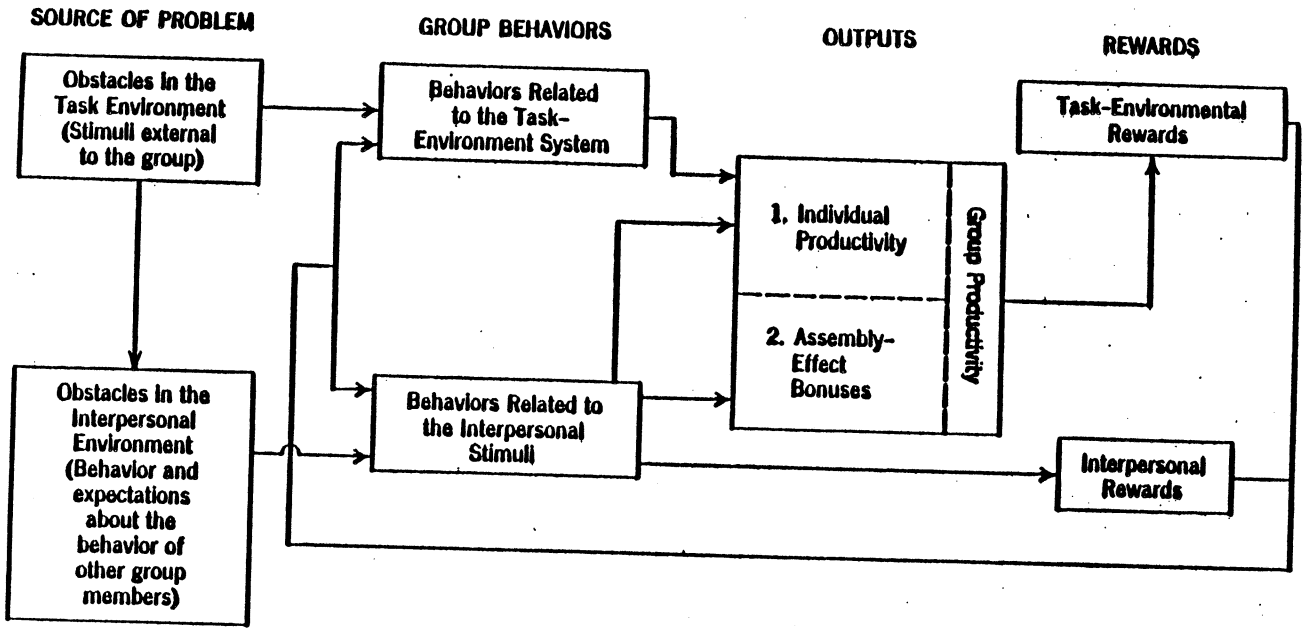

Figure 1. A simple working model of decision making groups (Collins & Guetzkow, 1964, p. 81).

is paid to variables that affect communication interaction in the problem solving group (Collins & Guetzkow, 1964, p. 88; Krueger, 1983, pp. 50-54; Littlejohn, 1983, pp. 206-7; Steiner, 1972, p. 12).

Parameters of the Study

This study focuses on small groups of people with a stated task or problem to be resolved who influence each other through direct, face-to-face contacts. This study will address elements of communication found by research to influence problem solving groups toward facilitation of task and maintenance objectives. However, while it is acknowledged that self-serving behaviors* do influence group interaction, to limit the scope of this paper, self-serving behaviors and other psychological events internal to members of a problem solving group are not addressed except as they have been operationalized into observable communication events which influence and are outcomes of group process, i.e., trust, feedback, and cooperation, etc.

The communication influences and factors are variables and outcomes of communication derived from research specifically studying communication relations in problem solving situations. Other variables that affect communication in problem solving groups may exist.

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*Self-serving behaviors are the hidden agendas or private opinions and motives of group members which influence their interpersonal relations in a group and are dysfunctional to the group (Goldhaber, 1983, p. 269).

This study does not address interpersonal communication factors in groups other than in a formal problem solving setting. This study seeks to add to the research on communication factors which can be applied in structured problem solving groups to increase the satisfaction and acceptance of solutions.

The Research Procedures

The Computer Search

Communication factors which facilitate acceptance and satisfaction with the group's decision were sought from the results of research specifically studying interpersonal communication influences in problem solving groups. A list of literature sources was obtained using Bibliographic Retrieval Services, Inc., a computerized data bank.

Research-oriented material was sought from two data bases: Psych Abstracts (searched from 1978 through July 1983) and Dissertation Abstracts International (searched from 1861 through 1977). The descriptors "interpersonal communication" and "problem solving" were selected for data retrieval. By limiting the computer search for journal articles to the last five years, the most recent research would be determined. Bibliographies of the journal articles and the dissertations provided research depth to the study.

Research Selected for the Study

Research that studied problem solving and communication in marriage and the family, adolescents and children, or with gender as a determinant of behavior was deleted. Psych Abstracts and Dissertations International yielded thirty-seven sources from 1978 to 1983. Dissertation Abstracts International from 1861 to 1977 provided eleven sources.

Limitations of the Computer Search

While a computer search system provides a practical, up-to-date and efficient research method, the data base chosen can only provide sources which have been entered into the data base. The trained researcher who assisted in my literature search advised that the substantive literature we were seeking would not be found in the ERIC OR Business Index data bases. Further, researchers in the communication discipline do not have their studies compiled in a communication studies data base. Studies in speech communication are subsumed within the data bases of other disciplines. Hence, communication research studies must be sought through less than current summaries or overviews.*

Inclusion of Other Research for the Study

A manual search of Communication Yearbooks, 1977 through 1982, revealed no relevant studies on problem solving or

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*It would be invaluable if Cragan and Wright (1980) and Larson (1971) entered their overviews of communication studies into a data base.

decision making. Several studies were unearthed in comprehensive summaries of speech communication research (Cragan & Wright, 1980; Larson, 1971). A manual search of master's theses at the University of Wisconsin-Madison provided two additional sources. Books by respected researchers in the small group communication and problem solving areas of study were also consulted.

Key Terms Used in the Study

Group Process. Process includes all the productive interpersonal actions by which people achieve a task and all those nonproductive actions that are prompted by frustration, competing motivations, or inadequate understanding (Steiner, 1972, p. 8).

Group Problem Solving or Group Decision Making. Group problem solving is an activity involving recognition and diagnosis of a problem, generating and testing of solution proposals, and decision to adopt and implement a particular proposed solution (Hallenstein, 1976, p. 8).

Effective Group Problem Solving. Problem solving is effective when determinations (a) are sound (accurate, appropriate, workable, etc.); (b) are the product of all available resources in the group; (c) demonstrate creativity in content; and (d) reflect participants' awareness and responsiveness to their own group process (Hallenstein, 1976, p. 8).

Structured Problem Solving. Structured problem solving

is a formal, structured approach for solving non-routine types of problems. Problem solving approaches used in structured problem solving are commonly referred to as creative problem solving techniques and are most appropriately used when custom-made solutions are required. The majority are based upon specific principles and assumptions about creative thinking and problem solving (Van Gundy, 1981, p. 2).

Remainder of the Study

The remaining chapters of the study are organized as follows: Chapter Two is a review of literature seeking communication variables which work towards improving the human relations aspects in problem solving as distinct from task or technical skills. This literature is based on research which studied communication in problem solving groups.

The intent of Chapter III is to clarify how communication toward effective decisions may be improved. To accomplish this, Chapter III will discuss how communication variables relate to the two qualities of an effective decision.

Chapter Four presents insights gained from the study and a summary of the findings. Suggestions for future research conclude the paper.

Endnote

[1]Two revisions of Van Gundy's "Techniques of Structured Problem Solving" substantiate the work's definitiveness. Barlow (1982) states "All in all, this is an excellent book, both in its text and in its comprehensive bibliography which contains references to most of the major books in the field" (p. 7). The second review, published by Brain Technologies Corporation in Focus/Creativity (1981) regards Van Gundy's book as a "bible," a "well-researched, well-organized and well-indexed aid to creative problem solving. . . in every sense, this is a sober, advanced guide to CPS" (pp. 5-6). Further, the recency and completeness of "Techniques" justify it as a credible source.

CHAPTER II

REVIEW OF LITERATURE

"Effective group functioning can occur only when optimal levels of task and interpersonal efforts are reached" (Littlejohn, 1983, p. 261). 'Task and interpersonal efforts' are interrelated* communication behaviors; they determine the effectiveness of the group and consequently the effectiveness of its decision or solution** (Bales, 1953, pp. 142-3; Collins & Guetzkow, 1964, p. 61; Fisher, 1980, p. 67; Hare, 1976, p. 6; Hoffman, 1979, p. 188; Hoffman & Maier, 1964, p. 264; Tuckman, 1965, p. 385). As Figure 1 (page 8, Chapter I) illustrates, communication behaviors directed toward task resolution and interpersonal relations are affected by variables. To determine how communication variables affect problem solving effectiveness, this study deemed it essential to critically review researach literature. Chapter II is such a review of literature for

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*The interrelatedness and inseparability of communication directed toward task and interpersonal relations was indicated in Chapter I. One can fulfill both task and interpersonal functions with a single statement (Littlejohn, 1983, pp. 221-2).

**An effective decision is the result of communication leading to satisfaction with the quality of the solution (resolution of the task) and acceptance of the group's manner of communication (meeting social and emotional needs) (Carney, 1977, p. 8; Collins & Guetzkow, 1964, p. 60; Hoffman & Maier, 1967, p. 166; Hoffman & Maier, 1965, 1964).

communication variables based upon the research methodology set forth in Chapter I.

To present the review of literature in a coherent manner, an organizing framework was sought. However, no recent theories attempt to form a uniform category system of variables nor attempt to bring the research on variables to communication into an integrated framework (Littlejohn, 1983, p. 222). While variables that influence communication toward task and interpersonal efforts in problem solving groups have been researched widely (Littlejohn, 1983, p. 222) this study found a wide variety of classification systems and terminologies for those variables. It appears that while researchers are studying the same phenomena, the phenomena are defined differently. Researchers generally agree that variables interact to shape the nature of communication in problem solving groups but researchers rarely define, classify or study variables in similar ways. In the speech communication discipline alone, Cragan and Wright (1980) found thirteen category systems for discussing variables that affect communication in problem solving groups.[1]

Fisher (1980) contends that using different category systems to understand complex phenomena of communication is sensible, as it leads to achieving the "fullest possible understanding of communication and group process" (p. 104). Moreover, Fisher argues that the category system used for study of interaction inevitably reflects a way of understanding

that which is considered most important in the particular communication process (Fisher, 1980, p. 104). Among others, the following researchers have presented frameworks for discussing variables that affect communication in small groups: Bales (1953); Collins & Guetzkow (1964); Fisher (1980); Goldhaber (1983); Hare (1976); Shaw (1976); and Steiner (1972).

Of the category systems noted above, Goldhaber's seemed most suitable for this paper to use as a frame of reference in discussing variables to communication in problem solving groups. This paper selected Goldhaber's framework for four reasons: 1) clarity (categories are reasonably well-defined); 2) scope (categories reflect most major areas of study); 3) recency (1983); and 4) specificity to this paper's area of study (Goldhaber used the problem-solving group as the context for discussion of key variables to communication as it is a formal group activity and is the most common group in the work organization) (Goldhaber, 1983, p. 265). The selection of Goldhaber's framework supports Fisher's argument stated above that the category system used for the study of interaction reflects a particular perspective--in this case, the problem solving group.

Goldhaber (1983) lists the following key variables as influencing communication between members in problem solving groups: networks and small group ecology, individual versus group problem-solving, group size, leadership,

conformity, conflict, and functional dimensions (task, maintenance, and self-serving behaviors) (pp. 268-86). These key variables provide the basis for a critical review of research involving communication in problem solving groups. The discussion of the following literature seeks to discern in what ways research on the above listed variables can contribute towards improving communication between members of problem solving groups to achieve an effective decision.

Key Variables to Communication

Networks and Small Group Ecology

The review of literature in this section is concerned with how problem solving groups are influenced by message flow patterns and the spatial arrangements and physical distances between group members. Goldhaber (1983) defines message flow patterns as "networks." Networks determine "the paths that are open for the flow of messages" (Goldhaber, 1983, p. 271). Physical distance (seating patterns) and spatial relationships between members is called "small group ecology" (Goldhaber, 1983, p. 202). It is important to study both networks and spatial arrangements for their effects on satisfaction with problem solving group interaction.

Networks

A great deal of interest has been demonstrated at the organizational level regarding the adequacies and analysis of network structures for effective information flow (Goldhaber,

1983, p.272). While it is acknowledged that problem solving groups are usually interdependent with the larger organization of which they are a part, this paper is concerned with the effects of message flow in the problem solving group per se.

The number and arrangement of communication "paths" or channels among group members exert a powerful influence upon the group. For a problem solving group to function effectively its members must be able to communicate easily and efficiently. Communication networks that permit the free flow of ideas, affect the efficiency of the group and satisfaction experienced by its members with group process and solution. This study found that problem solving techniques have applied the results of research by employing different communication networks at different phases of the problem solving process to achieve more effective decisions.[2]

Networks are not necessarily dependent upon the physical location of group members but represent patterns of who can communicate with whom and whether the communication is direct or via another group member (Shaw, 1976, p. 138). Researchers have graphically illustrated several patterns of communication flow in the small problem solving group. As an example of the research, Figure 2 illustrates five-person communication networks derived from experimental investigations. Circles represent positions of group members, lines represent communication channels and arrows indicate

one-way channels or paths. The wheel, chain and Y networks are usually referred to as highly centralized because one person is central to all the messages, wherever they flow. The circle and comcon, for example, are considered decentralized networks because no one person is central to the message flow (Fisher, 1980, p. 78; Goldhaber, 1983, p. 271; Shaw, 1976, p. 139).

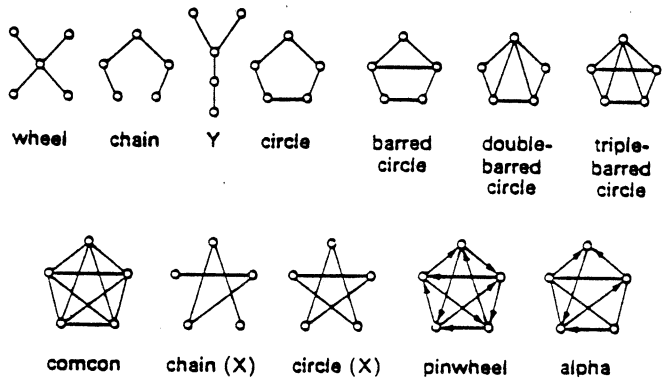

Figure 2. Communication networks used in experimental situations (Shaw, 1976, p. 139).

The usual method of research is to impose various communication networks upon groups in order to determine their consequences for group process. Studies have shown that various patterns of communication affect leadership emergence, member reactions, and problem solving efficiency.

Leadership Emergence. Research indicates that the person who occupies a central position in a communication network has a high probability of emerging as the leader of the group. When the network consists of positions of approximately equal centrality, a leader is less likely

to emerge (Shaw, 1976, p. 140). Furthermore, the functional role and personality characterisitics of the central figure have a great effect in determining the efficiency and effectiveness of that group (Clawar, 1966; Focar-Szocki, 1982; Goldman, 1979; Klier, 1955).

Group Member Reactions. Communication networks affect group member reactions to the group and its activities. In general a person who occupies a centralized position is more satisfied with that position than are group members who occupy less central positions with limited communication facilities. Since the morale of the group depends upon the satisfaction of its members, group satisfaction is greater in decentralized communication networks (e.g., circle, comcon) than in centralized networks (e.g., wheel, chain, Y). These consequences have been reported by almost all researchers who have examined satisfaction in communication networks (Shaw, 1976, p. 142).

Problem Solving Efficiency. The bulk of research on communication networks has been directed toward the analysis of problem solving efficiency. Researchers generally agree that the task is the determining factor among network efficiency. When the task is relatively simple and requires only the collation of information, a centralized network is most efficient in terms of time and transmission (Cohen, 1959; Klier, 1955; Shaw, 1976, p. 143). When the task is more complex decentralized networks are more efficient in

terms of time and accuracy; furthermore, in such instances, decentralized networks foster more cohesive groups (Fisher, 1980, p. y79; Goldhaber, 1983, p. 271; Shaw, 1976, p. 143). Greater accuracy is most likely due to the greater opportunity among decentralized group members for the exchange and development of ideas (Klier, 1955).

Shaw notes that research findings of relative efficiency for centralized and decentralized groups are contrary to the usual assumptions about centralized arrangements being the most efficient. In real-life situations where groups are faced with tasks more complex than the most complex experimental task, decentralized communication networks will be most effective (Shaw, 1976,p. 144).[3] A decentralized network, such as a circle, is thought to be more effective due to the coalition formation which emerges from this type of network.[4]

Explanatory Concepts. Why do communication networks partially determine group effectiveness and satisfaction? Shaw proposes two explanatory concepts: independence and saturation. Independence refers to the degree of freedom with which the individual may function in the group. A group member's independence of action is influenced by accessibility to information, situational factors, actions of other group members, and by the member's own perception of the situation. Defined in this way, independence is related to group efficiency but even more strongly to member

satisfaction (Shaw, 1976,p. 146).

The concept of independence helps to explain why higher levels of satisfaction and acceptance with the solution usually are the result of more open discussion (Hoffman, Burke & Maier, 1965, p.663). Moreover, it appears that the actual influence on the decision is the most important source of satisfaction for a group member. The results of Hoffman et al. (1965) suggest that while the opportunity to participate should be provided, neither the opportunity to participate nor the amount of participation is as critical to satisfaction as having had a direct influence on the solution or having one's opinion truly reflected in the decision (p. 666). Therefore, greater freedom to exert an influence on the solution leads to satisfaction.

The concept of saturation refers to the "communication overload experienced by group members in centralized positions in communication networks" (Shaw, 1976, p. 146). The total saturation of a central position derives from communication requirements, organizational decisions, and data manipulation that may be needed for task completion. Shaw states that the notion of saturation accounts for most of the effects of group performance observed in communication networks. For example, the central position in a wheel network is more vulnerable to saturation than any position in a decentralized network, such as a circle. Saturation will not result from demands of a simple task; therefore, the greater efficiency

for simple problems in a wheel network.

However, a more complex task places communication demands upon the central position to such an extent that the position quickly becomes at least partly saturated, thus reducing the efficiency of the group (Shaw, 1976, pp. 146-7). Thus, decentralized networks, being less prone to saturation are more effective in solving complex, ill-structured problems. Anything that increases demands upon the group is likely to interfere with centralized networks more than with decentralized networks (Shaw, 1976,p. 147).

Summary. Goldhaber (1983) provides a succinct summary concerning choice of network for problem solving situations. Problem solving groups should use a centralized network when the problem is simple, the group wants minimum messages and errors, and is looking for a leader. When the problem is more complex, a group should use a decentralized network if high morale, satisfaction with the problem solving process and flexibility are desired (Goldhaber, 1983, p. 272).

Goldhaber's summary of the research portrays an "either/or" choice of network for problem solving groups. In fact, problem solving groups may choose to use different communication networks for different phases of the problem solving process depending upon communication needs for tasks and goals (Chung & Ferris, 1971, p. 524; Erffmeyer, 1981, p. 79; Peebles, 1972, p. 2; Van de Ven & Delbecq, 1971, p. 210; Van de Ven & Delbecq, 1974, p. 605).

It should also be noted that Goldhaber's conclusions concerning choice of communication networks apply to organizations as consistently as they do to problem solving groups. For both problem solving groups and organizational structures, researchers generally agree that for the resolution of complex problems, especially human relations problems, the more open and decentralized the communication network, the better. Decentralized networks permit more involvement by group members or individuals in the organization, leading to greater satisfaction with the process of decision making and with the quality of the solution.

In conclusion, communication networks are of pivotal and basic importance to group member satisfaction with the quality of the decision and acceptance and support for the decision. Since the networks used in problem solving techniques directly influence who can communicate to whom and how much, the importance of network choice for a specific task cannot be underestimated. Furthermore, networks, "set the stage" and appear to be a basic paradigm for the interplay of the other key variables to communication. Networks seem to be a foundation for group member satisfaction with process and solution. After all, message flow must ensue for the other key variables (except for group size) to influence the group communication process.

If a problem solving group attempts to attack a problem without an agreed upon communication network, a network

will always emerge from the unstructured group discussion. Since research provides clear expectations and results to be derived from various networks, it seems reasonable and sensible to recommend that problem solvers utilize the results of research and choose a communications network in accordance with the above findings.

Small Group Ecology

Members of problem solving groups are also influenced by spatial arrangements and physical distance (Goldhaber, 1983, p. 273). Studies reveal that the choice of seating arrangements reflects cultural orientations and personal preferences which, in turn, affect the quality and patterns of interpersonal communication (McGrath & Kravitz, 1982, p. 213; Shaw, 1976, p. 137). Group seating arrangements also determine significantly the flow of communication and interaction in the group, the status assigned to group members and the emergence of leaders (Shaw, pp. 133-37).

Research shows a positive relationship between the perception of leadership and status and the central seating position in the group. The person who sits at the head of a rectangular table is usually perceived as the leader, and conversely, the leader usually chooses to occupy the seat at the head of the table (Shaw, 1976, p. 136). Sommer (in Goldhaber, 1983) found that other participants arrange themselves so they can see the leader. According to Sommer,

sitting within eye contact of the leader results in more participation (Goldhaber, 1983, p.202). Furthermore, more conversations are directed to those people who occupy the central seating position (Rawls, Rawls & Frye, 1969, p. 246). Persons sitting at the end positions of rectangular tables participate more and are seen as having more influence on the group decision than persons seated at the sides (Shaw, 1976, p. 134).

At rectangular tables adults prefer side-by-side seating for cooperative tasks and across the table seating for competition (Shaw, 1976, p. 132). Second, interaction is more likely to occur across a rectangular table than proceed around it (Shaw, p. 137). When members of a group are seated at a round table there is a strong tendency to communicate with persons across rather than adjacent to each other (Shaw, p. 134).

Correlating satisfaction with the seating arrangements of five-member groups, Thomas (1972) found that sitting close together (within two feet), at a round table, with good eye contact, rather than sitting side by side in a line arrangement, contributed to improved interpersonal communication, cooperation, group harmony, feelings of friendliness, warmth and informality (pp. 110-12). Sitting far apart (six feet) tended to arouse feelings of hostility, coolness, and formality which did not foster good interpersonal communication (Thomas, 1972, pp. 110-12).

Shaw (1976) provides a recapitulation of research on group ecology: group process is affected by the physical aspects of the environment and interacts with attitudes and beliefs. Second, individuals and groups typically assume a proprietary orientation toward where they usually sit which they defend against "invasion." Third, members of a group have personal standards for interpersonal distances between themselves and others which affects their choice of seating arrangements. Fourth, an individual whose personal space is invaded reacts defensively, evoking negative feelings. Fifth, there is a positive relationship between spatial position and status in the group. Sixth, seating arrangements determine to some extent the communication patterns in the group. Finally, seating arrangements influence the quality of group interaction (Shaw, 1976, pp. 148-52).

Summary. Satisfaction with the quality of the solution and acceptance of the decision is influenced by the seating arrangements of group members. While seating arrangements determine to some extent the communication patterns in the group, it appears that the greatest influence exerted by seating arrangements is on the social and emotional dimension of group process.

Problem solving methods should therefore arrange seating to foster interpersonal communication which enhances group climate for participation. This will, in turn, facilitate satisfaction with group process due to the felt perception

of having had an influence on the solution. Moreover, seating arrangements which put members close together, which minimize status and maximize eye contact, will encourage particpation.

Individual Versus Group Problem Solving

Since the latter 1800s to the present, research concerning group superiority over individuals in problem solving has been conducted. The research has yielded conflicting results. In many instances groups are not as effective or efficient as individuals in solving problems (Pankowski, Schroeder & Jahns, 1973, p. 21). Whether individuals or groups are more effective depends upon: 1) the skills and experience of the person involved (group resources including leader resources); 2) the nature of the task; 3) the interaction process; and 4) choice of individual or group interaction in the problem solving cycle (Gustafson, Shukla, Delbecq & Walster, 1973; Peebles, 1972, p. 2; Rohrbaugh, 1979, p. 90; Vroom & Grant, 1969, p. 78).

Group Resources. While it is difficult to quantify the superiority of groups or individuals in problem solving, the evidence seems to suggest that groups are superior in producing more ideas and decisions of better quality than an average individual working alone (Chung & Ferris, 1971, p. 524; Goldhaber, 1983, p. 274; Holloman & Hendrick, 1971, p. 489; Peebles, 1972, p. 2; Rohrbaugh, 1979; Vroom & Grant, 1969). An explanation of group problem solving superiority

is that while the group proceeds from independent thought through group discussion to final private opinion, culminating in an overt vote for the group solution, a person working alone moves from independent thought directly to final private opinion (Hall, Mouton & Blake, 1963, p. 154). Group problem solving can be conceptualized as a process that maps a "distribution of individual preferences" into a single collective decision (Laughlin & Adamopoulos, 1980, p. 941). Blau and Scott (1962) (cited in Holloman and Hendrick (1971) propose that groups are superior to individuals due to the error-correcting property of social interaction which takes place within the group. An individual problem solver has only his own perspective to consider, while social interaction provides for an exchange of ideas viewed from varied perspectives and backgrounds. The chances that false assumptions and errors in decision will be detected are multiplied (Holloman & Hendrick, 1971, p. 489).

Since the group usually contains all the resources needed for solving a particular problem, it is up to the leader to reach a group's potential (Maier, 1967, p. 246). Maier (1967) asserts that leader skill is the key to whether a group is superior to an individual in problem-solving (pp. 239-47). Choice and selection of group members will of necessity determine the kind and quality of resources available for leader facilitation.

Nature of the Task. Researchers generally agree that

the nature of the task or the problem to be solved influences whether groups are superior to individuals (Maier, 1967, p. 247; Shaw, 1975, p. 68; Vroom & Grant, 1969). Individuals are better on tasks that call for centralized action or organization of parts. Groups perform better than individuals when the process is problem solving but not necessarily when the process involves a judgment. (On the basis of statistical probability there is a greater probability in problem solving that at least one member in the group could solve the problem (Holloman & Hendrick, 1971, p. 489).) Groups are better than indivduals when a variety of information is needed to solve a problem and when a number of steps must be correctly completed (Shaw, 1976,p. 68).

Choice of Individual or Group Interaction in the Problem Solving Cycle. A study by Hall, Mouton and Blake (1963) can be applied to groups as a whole and to the consideration of when it is appropriate to elicit group interaction and when to use individual judgments in the problem solving cycle to allow the final product to be superior. Hall et al. (1963) summarize three distinct positions represented in the literature concerning group versus individual effectiveness in problem solving (p. 153). A "pooling" position argues that group decisions are superior in quality to decisions made by individuals due to the pooling of individual judgments. Groups do better on tasks that require pooling of ideas or information but individuals do better with tasks that

require individual labor and judgments (Gustafson et al., 1973, pp. 282-83). The "emergent product" position argues that groups are superior to individuals working alone because interaction allows a better solution or product to emerge. A decision which results from group interaction is considered "emergent" since it represents more than either a simple combination of member contribution or a mere reflection of the best member effort (Hall et al., 1963, p. 155). The "compromise" position rejects these two other possibilities and argues that group decisions merely represent a compromise of individual contributions.

Of the three positions, Hall et al. (1963) demonstrated that a decision produced through group interaction is superior because group discussion contributes something "over and beyond" the effects of statistical pooling. Apparently interaction facilitates success due to the group's discussion of individual judgments, allowing a product to emerge from the group's efforts (Hall et al., 1963, p. 155). Some researchers feel that problem solving is most effective when methods rely on individual work for idea generation and individual judgments are then pooled. The "pool" provides the basis for group interaction which allows the "emergence" of the group product. Interaction with the group has been found to be dysfunctional during idea generation of problem solving when the group task is to generate information on a problem and the measure of effectiveness is the number of ideas

or good ideas produced (Gustafson et al., 1973, p. 16; Peeble, 1972, p. 2; Rohrbaugh, 1979, p. 90; Vroom & Grant, 1969, p. 78).

By way of summarizing the research on individual versus group effectiveness in problem solving, Shaw proposes several hypotheses:

> 1) The mere presence of others increases the motivation level of a performing individual when the individual expects to be evaluated. . .
> 2) Group judgments are superior to individual judgments on tasks that involve random error . . .
> 3) Groups usually produce more and better solutions to problems than do individuals working alone . . .
> 4) Groups usually require more time to complete a task than do individuals working alone, especially when time is measured in man-minutes . . .
> 5) More new and radical ideas are produced by both individuals and groups when critical evaluation of ideas is suspended during the production period . . .
> 6) Decisions made after group discussion are usually more risky than decisions made by the average individual prior to group discussion . . . (Shaw, 1976, pp. 78-80)

This last hypothesis appears to be a result of responsibility for decisions being shared by group members.

Summary. While research on problem solving has shown that on the basis of statistical probability an individual may be able to solve a specific problem (Holloman & Hendrick, 1971, p. 489), group problem solving is often undertaken to ensure that the group that must execute the decision accepts the decision and feels good about the decision. By genuinely seeking opinions through the decision making process, member involvement toward the solution most

likely will help ensure support for enactment of that decision.

However, the content of this chapter is testimony to the many variables that operate on group interaction process towards a solution. If group problem solving is desirable, then it is mandatory to alleviate the inhibiting factors which interfere with group acceptance of the decision and satisfaction with the quality of the decision. To this end, group training in desirable group behavior has been shown to increase satisfaction with the decision promoting group goals over individual goals (Pankowski et al., 1973).

Group Size

From the discussion of the research on individual versus group problem solving it is apparent that groups can be superior to individuals for problem solving tasks. Research has shown that group size can affect the quality of the decision and member satisfaction with group process (Goldhaber, 1983, p. 285). Therefore, it seems essential to determine what constitutes optimum group size for problem solving and why size affects acceptance and satisfaction with the quality of the decision. Thomas and Fink (1963) reviewed thirty-one empirical studies of small groups and concluded that the major independent variable, group size, was related to several dependent variables.*

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*Dependent variables included group performance, distribution of participation, the nature of interaction, group organization, member performance, conformity and consensus, and member satisfaction (Thomas & Fink, 1963,p. 371).

Methodological short-comings of studies of group size precluded the assertion of further broad generalizations. The choice of group size for problem solving must take into consideration the effects of other intervening variables (Thomas & Fink, 1963, p.383).

Thomas and Fink (1963) cite specific findings from their review of the studies on small groups: quality of performance and group productivity were positively correlated with group size under some conditions, and under no conditions were smaller groups superior. The opportunity to adopt leadership functions (in a leaderless discussion group) decreased directly with an increase in group size. Studies involving the nature of interaction led Thomas and Fink (1963) to tentatively conclude that smaller groups inhibit expression of disagreements and dissatisfaction more than large groups. Moreover, smaller groups give each group member more opportunity to interact and to exhibit leadership behavior. A profile of several studies on group organization indicated that as size increased there was a decrease in group cohesiveness and an increase in organization and division of labor in the group, as well as development of cliques and factions. While conformity was affected by group size it can not be directly related to pressures to conform due to variations in task and procedures of the studies. The general trend of the thirty-one studies indicated that the smaller the group the more likely the individual will be

satisfied with the discussion and one's contribution (Thomas & Fink, 1963, pp. 373-78).

Holloman and Hendrick (1971) affirm that the smaller the group the more satisfaction and cohesion (p. 490). However, as groups get larger certain restraints work against satisfaction. While increasing the number of members in a group most likely increases the group's resources for dealing with a problem, there is less time for each member to contribute, the pattern of communication varies in the group, and subgroups began to form, with the result that increasingly larger proportions of the group are discouraged from making overt contributions (Holloman & Hendrick, 1971, p. 499). This decrease in opportunity to directly influence the decision leads to less satisfaction.

In terms of decision adequacy, Holloman and Hendrick (1971) conclude that group interaction does increase decision accuracy beyond that attributable to the statistical effects of averaging. However, the extent to which group decisions benefit from the effects of interaction is related to the size of the group. Groups of six were more accurate in terms of decision adequacy than groups of three and nine. However, groups of six did not differ significantly in their decision adequacy from groups of twelve and fifteen. Thus, "while groups of 6, 12, and 15 were equal in accuracy, considerations of economy point to the use of groups of approximately 6" (Holloman & Hendrick, p. 500). Groups of larger size seem to spend more time on leadership and procedural concerns,

leaving less time and energy for the solution of group task (Holloman & Hendrick, 1971, p. 490). Lending support to this last finding, Bare (1976) found that as the size of the group increases, a greater proportion of available energy must be allocated to the coordination of effort and group maintenance, leaving less time for task problems. Bare (1976) found morale and performance to be associated negatively with increases in group size (p. 133).

The variable of group size needs to be determined in each situation; therefore, a specific group size for problem solving cannot be generalized. Several reserachers do agree that five member groups are often viewed as the optimum size for decision making (Fisher, 1980, p. 244; Goldhaber, 1983, p. 285; Stumpf, Freedman & Zand, 1979, p. 772; Thomas & Fink, 1963, p. 377). Five member groups offer numerous possibilities for coalition formation[5] and management which increases the efficiency of the group (Fisher, 1980, p. 244).

Ottati (1981) offered contrary evidence when five member groups did not communicate more effectively than seven member groups (p. 102). Ottati regarded these results as inconclusive because the manipulation of group size did not "sufficiently maximize the effect on the dependent variables" (p. 102).

Shaw (1976) provides a comprehensive and clear summary of empirical research on group size. The total amount of participation in the group decreases with increasing group size. Second, differences in the amounts of participation

among group members increases with group size. Third, as group size increases, the probability of a leader emerging increases. Fourth, group members usually evaluate smaller groups more positively than larger groups. Fifth, conformity to unanimity increases with increasing size, at least up to some maximum. Sixth, the effects of group size upon performance are a function of the type of task that the group must complete (Shaw, 1976, pp. 186-87).

Summary. In the previous discussion, group size has been considered an independent variable, the manipulation of which depends upon several dependent variables as well as the nature of the task and group member resources. Five to seven members seem optimum for problem solving in laboratory situations. Though smaller groups seem more optimum, larger groups can provide more resources that help in solving the task but at the same time increase maintenance problems that affect group member satisfaction with the communication process (Steiner, 1972, pp.6-11).

Leadership

There are varying conceptions of leadership and what makes for leader effectiveness. No single definition or approach provides a comprehensive application. Specific situations call for particular types of leadership. This paper is concerned with problem solving situations where an effective leader helps others use their creative potential to solve problems. Current research findings and literature

see the role of leadership as interacting with and reflecting the relationship among members of a problem solving group. Effective problem solving group leaders must have the skill and experience to effectively facilitate member interaction and move the group toward completion of the task (Focar-Szocki, 1982, p.107; Goldhaber, 1983, p. 260; Isaksen, 1983, pp. 18-19; Klier, 1955; Maier, 1967, p. 247).

This literature review demonstrates that multi-dimensional considerations must be addressed when studying the nature of effective leadership today. A complex concept of what makes a leader effective and what that role should be, takes into consideration leader traits and behaviors along with situational factors such as environment, maturity, skill, knowledge, and organizational climate (Isaksen, 1983, p. 20). While members of a group have an individual responsibility for facilitating interaction toward a resolution of the task (Goldhaber, 1983, p. 270), problem solving methods generally assume that the leader has final responsibility for group effectiveness. Much of the research on leader effectiveness recognizes this responsibility, relating group effectiveness to the characteristics and behavior of the central figure in the group. The research discussed hereafter explores how a leader's behavior, skills, and characteristics affect various dimensions of group interaction, such as amount, kind, quality and results of that interaction.

Clawar (1966) found that a highly verbal, equalitarian leader in a centralized network promoted the solving of complex problems faster than did a high individualist leader (authoritarian personality). Apparently an equalitarian leader fostered a more open climate and encouraged a greater amount of contributions from group members which lead to faster resolution of the problem (Clawar, 1966) and higher morale (Bare, 1976, p. 142). Facilitating member contributions achieved better utilization of group resources and skills.

The importance of the leader in facilitating discussion is emphasized by Maier (1967). The discussion leader is the key to maximizing the assets of a problem solving group and minimizing its liabilities (Maier, 1967, pp. 239-46). According to Maier (1967) a leader must

> cease to contribute, avoid evaluation and refrain from thinking about the solution and group products. Instead he must concentrate on the group process, listen in order to understand rather than to appraise or refute, assume responsibility for accurate communication between members, be sensitive to unexpressed feelings, protect minority points of view, keep the discussion moving, and develop skills in summarizing. (Maier, 1967, p. 247)

A leader must also skillfully help the group to deal with disagreements. Maier and Hoffman (1965) sought to determine how a leader's attitude towards conflict affects the manner in which a problem solving group views disagreements. Results of the study showed that the attitude of the leader will determine whether conflict is a stimulant for innovation or a source of hard feelings. Furthermore, with the guidance

of a leader who views conflict as an opportunity for innovation, group resolution of disagreements leads to group member satisfaction and support for carrying out the decision (Maier & Hoffman, 1965, p. 384; Hoffman, 1979, p. 176).

The satisfaction of group members with the problem solving climate is also affected by leader attitude. Whether the leader perceived the group members as "problem people" or "idea people" correlates as negative or positive satisfaction with the process of decision making and acceptance of the solution (Maier & Hoffman, 1965,p. 385; Hoffman, 1979, p. 175). However, the research reveals that a leader must do more than just make people feel good about themselves through solicitation of their ideas (Hoffman, Burke & Maier, 1965, p. 666). Leaders must genuinely desire contributions from group members and strive to ensure that member opinion is incorporated, if possible, into the solution. Perceived influence on the decision by group members leads to greater satisfaction and acceptance of the solution. But while attempting to ensure member satisfaction, leaders must also maintain the quality of solutions by the manner in which problems are posed, ideas invited, and skills of members utilized (Maier & Hoffman, 1965, p. 385; Hoffman & Maier, 1967, p. 181).

A recent study reinforced the necessity to have effective facilitation skills but at the same time to have specific

content knowledge of the problem area and the problem solving process in order to maintain quality of solutions (Focar-Szocki, 1982, p. 107). However, research also suggests that the most difficult situation for a leader is one in which there is a strong need to develop a solution that is both high in quality and is acceptable to group members (Van Gundy, 1981, p. 281). This possible dilemma places the leader in the potential position of sacrificing quality at the expense of acceptance or vice versa. If the leader pushes for quality, the acceptance needed to implement the solution might be missing; by pushing for acceptance, quality might not be achieved (Van Gundy, 1981, p. 281). A study of how three leadership styles affect interaction in the problem solving group found that more effective problem solving groups predominantly tended to have leaders who used a variety of techniques and approaches to solve problems.[6] Furthermore, the leaders of more effective groups provided continual feedback of group progress and interaction, and delegated and shared authority and power with members in the group. The leader and group members made decisions together. Informal sanctions, such as group opinion, took the place of formal sanctions in more effective groups, although formal sanctions applied at decision points (Goldman, 1979, p.14). Goldman termed leaders in these situations as "technical" leaders. Technical leaders also interacted with group members frequently, actively, and freely (Goldman, 1979, p. 202).

In sum, technical leaders encouraged the use of member resources, which resulted in more effective problem solving groups (Goldman, 1979, p. 203). This finding supported Steiner's (1972) theory of productivity, that a group's effectiveness depends upon the specific use of member skills (p. 9).

Goldman (1979) noted that variables can impact on leader effectiveness. Two variables researched in Goldman's (1979) study were: 1) the effects of positive leader attitude toward group member skills; and 2) how well the leader fulfilled the role that group members expected (i.e., to lead the group to problem resolution). Goldman (1979) concluded that frequent leader interaction with group members conveyed the leader's positive attitude about group member's skills. Leader facilitation of member skills encouraged a climate of participation. Research concerning the second variable showed that positive leader behavior and attitude towards fulfilling the expected role resulted in more effective problem solving groups. Goldman's (1979) results support Hanlon's (1968) Law of Introspective Expectations which indicates that the extent to which a leader consistently fulfills the role expected by group members will influence the goal actualization of groups (p. 201). Goldman concluded that leadership communication style was a distinguishing feature of effective problem solving groups (p. 204).

Focar-Szocki (1982) attempted to isolate various factors which could predict leader effectiveness in the facilitation

of creative problem solving. The factors isolated were defined as characteristics, content, and transmission ability. Leader characteristics were found to highly correlate with the prediction of facilitation success (p. 95). Characteristics were defined as those attributes apparent in the facilitator which lead to or detracted from effective interaction and climate development. Of several characteristics studied, Focar-Szocki found that self-knowledge and awareness, disciplined imagination, environmental sensitivity, intellectuality and artistry, appeared most influential in creative problem solving (Focar-Szocki, 1982, p. 108). The results also indicate that personal characteristics may significantly influence how leaders acquire knowledge and transmit that knowledge during facilitation of creative problem solving (p. 97). Apparently leadership styles can be influenced by a large number of personality factors (Focar-Szocki, 1982, p. 95). However, it seems clear that effective facilitation of creative problem solving cannot be accomplished on the basis of personal considerations alone. The results of Focar-Szocki's study support the need for specific knowledge (content) and the ability to interact with the group effectively.[7]

Isaksen (1983) argues that successful facilitation of group member resources involves leader responsibility in integrating task and maintenance concerns--the leader is the facilitator of the relationships and interactions among group members (p. 22). Leader-facilitators

should remain free of over-involvement in the task resolution and provide supportive communication toward group relations (Isaksen, 1983, p. 25). Isaksen (1983) proposes a facilitative view of leadership and compares it with the more traditional approaches to leadership of the past (see Figure 3).

Facilitator	Other General, Traditional Leadership Characteristics
Involved in setting climate	Concerned with conveying the task
Elicits and clarifies purposes	Tells the members what the purposes are
Relies on desire(s) of member(s) as motivational force	May use power and authority to get things done
Organizes and makes available wide range of resources	Controls and allocates resources
Is a resource to be utilized by (group) members	Works and decides alone; prefers to be 'lonely at the top'
Responds and accepts content and attitude of expressions	Cuts through group process concerns to assure task completion
Moves toward becoming a member [of the group]	Searches for more efficient means of control
Remains alert to expressions of feelings	Concerned with supervision of activity and more aware of increasing potential power

Figure 3. A comparison of a facilitative model of leadership with more traditional approaches to leadership (Isaksen, 1983, p. 24)

Isaksen's facilitator role is highly "person-oriented" rather than task oriented. The facilitator seems to need a high degree of interpersonal communication ability to successfully

integrate task and social and emotional concerns of group members.

Isaksen (1983) notes that the more current view of leadership examines the many sitational factors which must be taken into consideration when determining leader effectiveness (p. 20). A contingency model of leader effectiveness recognizes the effects from situational variables. Situational variables are described by Fiedler (1967) in Shaw (1976, pp. 280-83) as: 1) leader position power; 2) the structure of the task; and 3) the personal relationship between leader and group members. In general, the situation is more favorable for leader effectiveness when: 1) group members accept and comply with the leadership; 2) the task is highly structured; and 3) leader-member relations are good. The most unfavorable situation is one in which leader position power is weak, the task is unstructured, and the leader-member relations are poor (Shaw, 1976, pp. 282-83). Apparently, leader-member relations exert the strongest effect toward creating a favorable situation for a leader to be effective (Greene & Schriesheim, 1980, p. 51; Ruzicka, Palisi, Kelly & Corrado, 1979, p. 100). A good relationship with group members allows more energy to be devoted to the task.

Moreover, Fiedler (in Shaw, 1976, p. 282-83) discerned that leaders can be classified as more person oriented and more task oriented by demonstrated leader behavior. These patterns of behavior determine the relative effectiveness

of leaders in various situations. When things are not going well in the group, the task oriented leader appears to be more effective because the group will more easily accept directives, and, need directives. But, when things are going only moderately well, the person oriented leader is more effective (Shaw, 1976, p. 283). Such findings point out that the kind of leadership that is most effective depends upon the situation (Shaw, 1976, p. 283).

Summary. Two major themes emerge from recent research on leadership in problem solving groups: 1) group members should be regarded as the primary resource for solutions to problems; and 2) the role of the leader is to ensure full utilization of member resources. Leader characteristics, traits, styles and the situational variables impinge on how effectively the leader utilizes the group resources. Leadership behaviors can be suggested, but individual styles are influenced by a large number of idiosyncratic personality factors (Focar-Szocki, 1982, pp. 95-96). There appears to be no such thing as one universally good leader, but there is a range of leadership characteristics and behaviors which are deemed appropriate for different problem solving phases, tasks, situations, and groups.

Conformity

Fisher (1980) defines the key variable of conformity as uniform behaviors exhibited by members of a social system

resulting from the members choosing, from among conflicting alternatives of behavior, that alternative least subject to negative social influences" (p. 332). These "uniform behaviors" are patterned actions or attitudinal expressions and constitute the established norms of a group (Hollander & Hunt, 1967, p.409). Groups need to exert pressure for the members to conform to the established norms for that particular group as goals cannot be achieved without some degree of conforming behavior (Hollander & Hunt, 1967, p. 409).

Group members respond to explicit or implicit norms of behavior. Explicit norms are more formal, usually verbalized, expected patterns of behavior, such as the methodology of a problem solving technique. Implicit norms are informal, unspoken but understood and accepted, such as (in our culture) not burping in public. To ensure collective support for the norms in a problem solving group, norms should always be a reflection of the values shared by group members (Fisher, 1980, p.183; Hoffman, 1979, p.178; Hollander & Hunt, 1967, pp. 410-11). Norms for a particular group develop through the influence of feedback mechanisms[8] and thus vary from group to group (Hollander & Hunt, pp. 410-11). Norms imply a degree of "oughtness," describing how members ought to behave in the situation (Fisher, 1980, p. 181).

Research findings specify several preconditions for conforming behavior found in problem solving groups. Group members adopt certain norms due to the nature of the group

decision making process. Members are willing to conform to them precisely because they perceive the norms to benefit and reward the successful performance of the group's decision making efforts (Fisher, 1980, p. 186; Hoffman, 1979, p. 188; Hollander & Hunt, 1967, p. 409). The amount of feeling group members have for identifying with the group will influence the degree to which group members are willing to conform (Fisher, 1980, p. 186). The more closely a group conforms to its norms, attitudes and values, the more cohesive it is (Goldhaber, 1983, p. 282). It appears that cohesiveness is a result of conformity: members of cohesive groups are highly aware of the norms of the group and know what behavior is expected to exhibit commitment to the group (Hoffman, 1979, p. 181).

Without cohesiveness, problem solving group members are unlikely to produce a strong pressure for conformity on deviant members (Fisher, 1980, pp. 185-87; Hoffman, 1979, p. 176). Raven (1953) found that the "deviant" was more likely to change an opinion if the opinion had to be verablized to others and if the group member could be rejected for different opinion or behavior. Raven found that extreme deviates (those who held to their opinions with greater intensity) were less likely to change toward the norms of the group (p. 899). Variations in conformity to the group can be generalized to occur due to the following: 1) how visible one's attitude or behavior is to relevant others;

2) the extent to which one associates with a desired image or attitude; 3) how relevant the role is to the individual; and 4) the extent of anticipated satisfaction or reward from conforming (Witt & Sen, 1972,p. 53; Wilson, 1972).

Summary. A person belongs and conforms to a group as long as there are rewards, i.e., recognition, a shared pride in achievement, a sense of belonging and approval--an individual gains indirectly by conforming (Hollander & Hunt, 1967, p. 410). Thus, a member's actual participation may be based on matching individual needs against group inducements, e.g., acceptance by the group, social approval, perceived need for structure, satisfaction from the task or prestige from being in the group. All these factors may be at work determining the basis for conformity (Holander & Hunt, 1967, p. 415).

Conflict

Research results generally confirm that divergency of opinion and feeling is welcomed in problem solving groups. Welcoming differences can lead to fuller discussion and exploration of a problem, resulting in more effective and creative solutions. Second, greater acceptance of group process results when substantive conflict is encouraged (Hoffman & Maier, 1979, p. 176). Conflict is also beneficial when it integrates the divergent needs of group members; group members are more likely to carry out a solution if they have participated in its resolution

(Maier & Hoffman, 1965, p. 373; Schulz & Pruitt, 1978, p. 492).

To encourage more creative solutions, group processes and problem solving structures must provide norms for the expression of conflict. Desirable group norms for the expression of conflict can be learned through process training, where group members come to regard difference of opinion as the means to a more effective solution and as a natural outcome of a problem solving situation* (Hall & Watson, 1970, p. 310; Pankowski, Schroeder & Jahns, 1973, p. 22). A research study found that previous to process training, groups exhibited a "strain toward convergence"--a need to resolve differences quickly and reach closure. A concern for quality of solution and human relations functions became secondary to the need to get the job done (Hall & Watson, 1970).

Training groups to produce decisions through concensus produced decisions qualitatively superior and more creative than groups untrained in consensual guidelines.[9] Furthermore, trained groups adopted a "working-through" approach to the handling of conflicts in the group (Hall & Watson, 1970, p. 300). These groups also achieved the "synergy bonus" or assembly effect[10] more frequently and by a greater margin than did untrained groups. Time to reach decisions did not differ substantially between the trained and untrained groups. Hall and Watson (1970) state that the major impact of group training was on group effectiveness as measured

by the quality of the decisions reached (p. 313).

A modified replica of the Hall and Watson (1970) study revealed similar results between trained and untrained groups (Nemiroff & King, 1975). Contrary to the 1970 study by Hall and Watson, Nemiroff and King (1975) found that instructed groups took fifty percent longer to reach decisions than uninstructed groups in consensual guidelines (Nemiroff & King, 1975, p. 1).[11]

Structuring the study to test subject's reactions toward satisfaction with decision, self-performance and perceived group effectiveness, Nemiroff and King (1975) found no differences on these measures between trained and untrained groups (p. 19). The researchers concluded that while consensual techniques permit increased involvement in the decision making process, they do not necessarily lead to increased acceptance of the group's final product, nor do they automatically create a favorable attitude toward group work in carrying out the solution (Nemiroff & King, 1975, p. 19). However, the use of the guidelines promoted the expression of disagreements as a natural occurance, differences of opinion were viewed as helpful, and through instructions group members became more concerned with group goals than with individual goals (Nemiroff & King, 1975, p. 19; Erffmeyer, 1981, p.78).

Schulz and Pruitt (1978) caution that for healthy handling of conflict more is needed than just the opportunity for free expression of opinion. Group members must have some

form of cooperative orientation--"groupness"--towards each other that acknowledges the goals of the group over that of self-oriented, individualistic behavior (Schulz & Pruitt, 1978, p.492). Individualistic behavior, such as dogmatism, can lead to conflict. Groups which have a relaxed, equalitarian group climate and have norms which allow for divergency of opinion have conditions that tend to mitigate the rigidity of a strong opinion held by a group member (Abramo, Lundgren & Bogart, 1978, p. 751). An explanation for this finding is that apparently when group members are confronted with alternative judgments and opinions of others, there appears to be an element of compromise, of mutual acceptance, and a tentativeness of judgments within group interaction (Abramo et al., 1978, pp. 750-52). Similarly, a supportive group climate encourages members to feel comfortable in expressing opinions (Stewart, 1982, pp. 235-40).[12]

Apparently, disagreement and agreement are essential information handling behaviors, but the expression of disagreements creates tension. The use of humor can effectively dispel this tension while still recognizing that disagreement is an essential problem solving and interpersonal behavior (Weckler, 1982, p. 3505).

One role of a leader in conflict is to ensure that the group as a whole resolves conflicts rather than adopting a norm that the leader has the power to arbitrate or decide. Giving the leader power to decide, absolves the group from

having to work through differences of opinion; differences of opinion leads to better quality decisions (Hoffman, 1979, p. 170).

Summary. Currently research contends that the key group communication variable--conflict--is viewed as a natural and desirable outcome of successful problem solving group interaction. Basic to the utilization of conflict as beneficial, is the need for well-understood norms for its expression and group member commitment to group goals.

Functional Dimensions: Task, Self-Serving Behaviors and Maintenance Task Dimensions

The functional dimension of "task" refers to the technical quality and content of communication directed toward solving the problem a group faces.[13] The task role emphasizes communication and behaviors which are oriented toward maintaining the quality of the solution to the problem (Bales, 1953; Fisher, 1980, p. 38; Goldhaber, 1983, p.268; Hoffman, 1979, p. 199; Krueger, 1983, pp.59-60; Littlejohn, 1983, p. 221; Tuckman, 1965). This paper will not address communication behaviors specifically directed toward task solution--or "how" to solve a problem--problem solving structures provide the necessary guidelines and structures for optimum resolution. However, this paper will examine variables influencing communication directed towards task as interdependent and inseparable from that of communication directed towards

maintenance problems.*

Self-Serving Behavior Dimensions

The second element in the key variable of "functional dimensions" is "self-serving behaviors."[14] These behaviors are the hidden agendas or private emotions and motives of group members which influence the interpersonal relations in a group and are dysfunctional to the group. "Self-serving behaviors" are not discussed in the body of this paper; however, these dysfunctional behaviors can be somewhat alleviated through group process training (Pankowski, Schroeder & Jahns, 1973; Hall & Watson, 1979, 1970; Nemiroff & King, 1975; Easton, 1971; Hallenstein, 1976).

Maintenance Dimensions

The third element of functional dimensions assumed by members of a group are maintenance behaviors. "Maintenance dimensions" are the interpersonal communication behaviors which ensure cohesion and harmony in the group and create a healthy group climate to help maintain acceptance of the problem solving function. "Maintenance" can be described as how group members feel about the "way" they communicated with each other to solve the problem. Maintenance behaviors determine to a great extent the satisfaction with the quality of the solution and acceptance of the decision

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*The cognitive and emotional states influencing process are interactive. For every affective state there also is a representation of cognitive state in the form of some structural relation among beliefs within a system (Easton, 1971, p. 21).

that group members feel (Bales, 1953; Collins & Guetzkow, 1964; Goldhaber, 1983, p. 269; Hoffman, 1979, p. 199; Krueger, 1983, pp. 59-60; Shaw, 1976, p. 447; Littlejohn, 1983, p. 221).

Maintenance behaviors or group relational functions desirable in group discussions toward an effective decision are defined by Benne and Sheats (1948) and cited in Goldhaber (1983, p.269) and Krueger (1983, p. 60). These group relations functions are: a) harmonizing (resolves differences and reduces tension); b) compromising (offers a compromise on an issue or change in position); c) encouraging and supporting (praises, agrees with and accepts the contributions of others); d) gatekeeping (keeps communication channels open by facilitating interaction from all members as well as regulating the flow of communication); and e) standard setting and testing (checks out the group process, people's feelings, group norms, etc., to evaluate the operation of the group).

Though Benne and Sheats (1948) list desirable group relations functions or behaviors, this paper found that researchers, for the most part, have not directly studied "harmonizing," "compromising," etc., in problem solving situations. However, research for this study did reveal studies* which appear to more directly address group relations

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*Trust, feedback, cohesiveness and cooperation were areas of study revealed by the literature search for influences on communication in problem solving groups.

functions and behaviors. These subjects of research studies do not fit neatly into Goldhaber's (1983) classification of key variables to communication nor are an element of group maintenance as defined by Benne and Sheats (1948). Such areas of study can be included under maintenance dimensions. Therefore, trust, feedback, cooperation and cohesiveness are included in the following discussion of maintenance behaviors (defined by Benne and Sheats (1948).

Trust. Trust is a key factor influencing the problem solving process (Krueger, 1983, p. 22). Previous research led to the conclusion that trust can be characterized as a "subprocess," an element that interrelates with and influences any interpersonal communication.[15] Trust characterizes a relationship, not an attitude (Fisher, 1980, p. 33). Trust is "an expectancy held by an individual that the word, promise, or statement of another individual can be relied on" (Klimoski & Karol, 1976, p. 630). Trusting involves the admission of dependency; and trustworthiness is an acceptance of the obligation not to exploit another in a dependency situation (Littlejohn, 1983, p. 168).

Most of the research on trust in problem solving group situations can be summarized into one main idea: reciprocity. Communication that expects and gives trust will likely elicit trust. This reciprocal notion of trust-building is characterized by a spiraling effect. That is, trust tends to be self-perpetuating or synergistic, leading to a spiraling upwards

or downwards, depending upon the positive or negative reinforcement from previous experiences with other group members (McGrath & Kravitz, 1982, p. 215; Krueger, 1983, p. 22).

A second theme about trust is that trust-building takes time to develop. Trust emerges after a relationship endures and perpetuates itself (Fisher, 1983, p. 33). Conversely, trust can be destroyed or the trusting relationship damaged much more quickly: one incident of mistrust can destroy months of cooperative, trusting behavior (Fisher, 1980, p. 33; Krueger, 1983, p. 23; Leathers, 1970, p. 181). Klimoski and Karol (1976) found that while a trusting relationship takes time to develop most people in new relationships assume trust exists until it is proven otherwise to them (p. 630).

A third theme found in the research on trust is that low levels of trust are likely to inhibit problem solving effectiveness. "High trust" groups outperform "low trust" groups (Klimoski & Karol, 1976, p. 630). Apparently low levels of trust inhibit spontaneity and openness that is required for problem solving effectiveness.

> One who does not trust others will conceal or distort information, will disguise feelings or opinions that he believes will increase his exposure to others; he will hesitate to reveal information . . . or ideas, primarily to reduce his vulnerability . . . only those ideas that are socially acceptable will be voiced in the group . . . In creative problem solving tasks this defensiveness . . . is antithetical to what is required to produce a maximum of fluency of ideas . . . it could result in 'norms of noninvolvement' . . ., which reduce commitment and participation, and thus could contribute to inferior group performance. (Klimoski & Karol, 1976, p. 630)

The final theme found in the research on trust involves trustworthiness. Members of a problem solving group need to feel that a fellow group member can be trusted to perform a task or responsibility, fulfill a position or role that is assumed. If the group member who assumes the responsibility or role does not carry out the task, trust is reduced in the others' perception, reducing problem solving effectiveness (Fisher, 1980, p. 33; Goldman, 1979, p. 201).

Summary. As a maintenance factor, trust encourages a fuller sharing of group member resources, leading to more effective group decisions.

Feedback. Fisher (1980) defines feedback as a "mutually causal sequence of events or acts which, self-reflexively, exerts influence on the original act or event in the sequence" (p. 333). Feedback responses occur within a group and can be also provided by sources external to the problem solving group (Littlejohn, 1983, p. 35). An example of an external source would be other agents within the larger organization of which a problem solving group is a part.

In the group, feedback is a subprocess which occurs within the usual sequence of discussion interaction and directly reflects the interactive nature of that communication. As such, feedback in the group is a process which occupies a major portion of the total effort in group interaction; the quality of that feedback equals the single best indicator of quality of communication in a small group[16] (Leathers,

1972, p. 168; Leathers, 1969, p. 299; Scheidel & Crowell, 1966, p. 273).

A frequency analysis of types of comments made during problem solving discussions revealed that a large part of the time comments were characterized by acts of clarification, repetition, statements of agreement, and other comments more closely related to social and emotional needs than to task needs (Scheidel & Crowell, 1966, p.273). Feedback behaviors can be described as a "circular process which probably serves an anchoring function in the group communication process" (Scheidel & Crowell, 1966, p. 278). The acts of clarification, repetition, and agreement serve to facilitate the human relations elements of group process and increase the quality of communication in the group (Scheidel & Crowell, 1966, p.273).

Research by Leathers (1972, 1969) amplified the work of Scheidel and Crowell (1966). Leathers' (1972) study was based in part on the research by Scheidel and Crowell and supported the notion that quality feedback is the single best indicator of quality of communication in the small group (p. 168). Leathers (1972) established a direct relationship between quality of communication and the quality of product in a problem solving group (p. 173). The more explicit and direct the feedback related to task, the more relaxed and clear were the responses. Ambiguous statements produced

responses that were irrelevant to the task at hand and resulted in inhibiting group members more than in helping them to work constructively toward the problem (Leathers, 1969, pp. 299-300).

Feedback responses from sources external to group members also influences participation between members of the group. Griffith and Gray (1978) discovered that organizational power structures in a group's environment can exert considerable influence on how groups solve problems. The researchers found that groups given positive feedback about which outcomes were considered successful resulted in increased group productivity and satisfaction with group problem solving process (Griffith & Gray, 1978, p. 233). When members of a problem solving group were given favorable feedback from external sources on their performance, the individuals in these groups reported more cohesion, better communication, higher member ability, satisfaction and motivation than groups which were given unfavorable feedback on performance (Downey, Chacko, McElroy, 1979, p. 288). Comparing short (thirty minute) and longer group histories (twelve weeks) the researchers found that current feedback on group performance is more important than previous experiences in the same group in determining how members felt about their group (Downey et al., 1979, p. 297).

Research results of Downey et al. reinforced Bales (1953) who pointed out that a group needs to be reinforced

positively to keep them doing what they are doing well and keep members feeling good about what they have accomplished. Furthermore, feedback is "situation specific," that is positive feedback from one area or task most likely cannot be generalized by the recipient to another task (Bales, 1953, pp. 124-25). Bales maintains that satisfaction levels of group members can be maintained if positive feedback outnumbers negative feedback (1953, pp. 124-25).

A study by Rawls, Rawls and Frye (1969) substantiates the relationship of positive feedback to member satisfaction with group process. Rawls et al. (1969) suggested that to gain satisfaction from participation in a group, a member had to perceive that the group had a need, that the member could perform the task or contribute resources to it, and that member performance was appreciated by the group (pp. 246-47). Thus, feedback is an indicator of the receptivity of actions and serves to redirect or reinforce previous behavior.

Summary. Feedback communication by all members of a problem solving group serves to redirect or redefine previous communication behavior. Therefore, it is important that such communication be timely, positive, specific and conveys appreciation and respect for fellow group members' contributions.

Cohesiveness. Cohesiveness, for most people who use the term, refers to the degree to which group members are motivated to remain in the group (Shaw, 1976, p. 197).

Cohesiveness is closely related to conformity; usually the more conforming a group is, the more cohesive (Goldhaber, 1983, p. 282). However, cohesiveness and conformity to group norms can be carried to the point where no deviance is allowed. This phenomenon,"group think"* is dysfunctinoal to a problem solving group whenever the presentation of many points of view is necessary to achieve the most satisfactory, creative and effective solution.

Cohesiveness can be observed both as a relationship and as a reflection of an attitude. Lott and Lott (1965) found that motivation to remain in the group and positive attitudes towards other members of the group is increased by an individual's experiencing positive rewards in the presence of others (p. 373). Harper and Askling (1980) found that among competing groups in a media production organization, the members of the successful groups always made a point of publicly sitting together when all groups convened (p. 94). Goldman (1979) noted that the more effective problem solving groups[17] have greater group cohesiveness[18] than less effective problem solving groups and that these conclusions support the works of Goodacre (1951), Shaw and Shaw (1962), and Berkowitz and Levy (1956) (p. 200).

Although group cohesiveness has been related theoretically

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*Group think, a term coined by Irving Janis, is "the phenomenon that occurs when members of a highly cohesive group disregard alternative courses of action in favor of maintaining unanimity of opinion in the group; an absence of critical idea testing and conflict typical of the natural group process" (Fisher, 1980, p. 333).

and empirically to numerous process variables, Shaw (1976) lists the major variables as: group interaction, social influences, group productivity, and satisfaction (p. 198).

Summary. "Relative to low-cohesive groups high-cohesive groups engage in more social interaction, engage in more positive interactions (friendly, cooperative, democratic, etc.), exert greater influence over their members, are more effective in achieving goals they set for themselves and have higher member satisfaction" (Shaw, 1976, p. 209).

Cooperation

In a cooperative situation all group members hold the same goal for the group and individual goals work toward group goals (Shaw, 1976, p. 324). Problem solving groups may tacitly assume that the group goals are known to group members, and that all members accept it and will work toward its attainment. Although the tacit understanding is often present, group members may have individual perceptions of the group goals and especially about the degree to which they are committed to achieving them. The more that members are committed to the same goals, the more positive the effects upon group functioning (Shaw, 1976, p. 328). It is important to keep in mind that tasks vary in the degree to which they require coordinated actions. Therefore, the cooperation requirement toward group goals varies with the task and will influence the performance of the group (Shaw, p. 324).

A study of how cooperation in a group affects group productivity found that the way in which group members cooperate or organized themselves is as an important determinant of group performance or goal attainment as was the creative ability of members to solve a problem (Kabanoff & O'Brien, 1979, p. 530).

Cooperation is also closely related to the cohesiveness of a group. A cooperative orientation in the group leads to greater satisfaction with the group and with the quality of the decision (Maier & Hoffman, 1965, p. 373). Interpersonal relations are generally more positive in cooperative than in competitive situations (Shaw, 1976, cited in Littlejohn, 1983, p. 226).

Curiously, when a group effectively reaches a goal, group members have a tendency to attribute the success to themselves. When a group has difficulty reaching a goal, group members tend to attribute the failure to other group members (more than to self) in the cooperative situation. This is of interest since such attribution has negative consequences for group interaction and cohesiveness (Shaw, 1976, pp. 327-28).

Kabanoff and O'Brien (1979) conclude this brief discussion of cooperation by suggesting that instead of asking when cooperation is superior to noncooperation, it would be more useful to ask what forms of cooperation are optimally productive for different types of tasks.

Summary. It seems feasible to suggest that cooperation in a problem solving group should focus on agreement to find the most creative solution possible. Secondly, a group should have a cooperative orientation and commitment toward the use of good communication process.

Gatekeeping. Of the maintenance functions listed by Benne and Sheats (1948) in Goldhaber (1983), gatekeeping was the only subject of research. Benne and Sheats equate the gatekeeping function as an "expediter" role, that is, to keep communication channels open by encouraging, facilitating, and regulating the participation and flow of communication by group members (Goldhaber, 1983, p. 86). Gatekeeping occurs at the small group, organization, and mass communication level. The previous discussion of centrality in communication networks illustrates the role of gatekeeper as the one who is most central to message flow and therefore is in the position of deciding what and how information should be relayed or retransmitted. Traditionally, a group leader has assumed this central role of receiving information, facilitating communication between individuals, relaying messages, converting data into a manageable amount of information, and conveying it in a more understandable form (Fisher, 1980, p.85; Maier, 1967, p. 246). Thus, a gatekeeper can be defined: "a person who, whether interacting within the formal or the informal channels of communication, can determine if and how a message will be transmitted" (Blake & Haroldsen,

1975, p. 109). By this definition all members of a group are, at least to some degree, gatekeepers. Each member of a group can assume a facilitating attitude to actively encourage and solicit the participation of other group members to facilitate the utilization of group member resources (Johnson, 1977, in Fisher, 1980, p. 86).

However, the gatekeeping function can vary depending upon the structure of the communication network in the problem solving group. Groups which encourage full member participation find it is the responsibility of all members to facilitate the exchange of information to ensure equal access to information on which to base a solution to a problem. In groups with a central figure, to whom messages are directed, centrality to message flow carries a responsibility based on the possession of information influence. For most effective decisions, the central figure must adopt an attitude which facilitates interaction and information exchange between members to achieve full utilization of group resources. This attitude would deemphasize the possible misuse of the natural informational advantage possessed by the central figure which would be to the detriment of acceptance of group process by group members (Fisher, 1980, p. 87).

Summary. It seems reasonable to conclude that gatekeeping may be the ultimate responsibility of a problem soling group leader but this does not necessarily absolve group members from assuming a "gatekeeping" attitude toward

fellow members.

SUMMARY

Researchers who have studied the interacting effect of variables on communication in problem solving groups seem to agree that the nature of the problem affects the communication process in the group. In addition, the elements of member resources, participation, and the influence of communication variables on member input in the group will to varying degrees determine the effectiveness of decisions (Thomas and Fink, 1961, page 62).

The strong interactive and reflexive nature of variables that affect communication precludes a generalized, all-inconclusive set of rules to be followed in problem solving groups. Each variable can be a dependent variable for another independent variable--the possible combinations are almost infinite. Variables continuously interact and create different possibilities for group outcomes. Each problem solving situation must be considered to be uniquely affected by variables of the communication process in the group. Therefore to separate out variables and apply them for specific results for specific problem solving situations is a prodigious if not impossible task. However, research results do provide suggestions for what appears to be effective for communication in problem solving groups.

Endnotes

[1]Cragan and Wright (1980) reviewed communication research published in speech communication journals from 1969 to 1979.

[2]Some theorists favor group process which combines communication networks restricting verbal interaction with face-to-face unrestricted processes. These theorists feel that interaction during the generation-of-ideas phase of problem solving is dysfunctional but that verbal unrestricted interaction during the assessment or evaluation phase of problem solving has positive features including clarification and justification of items generated so that a more informed process of group decision making can take place (Gustafson, Shukla, Delbecq & Walster, 1973, p. 283; Delbecq, Van de Ven & Gustafson, 1975).

[3]Because decentralized groups draw uneven participation, research indicates that a possible optimal group process for problem solving is to: 1) use a nominal group process for fact-finding and idea-generation (people work in the presence of others but write ideas independently rather than talk about them); 2) to use an interacting or decentralized group process (verbal and nonverbal communication takes place between all members) for information synthesis, idea evaluation and group concensus; and 3) to use a nominal group process for the final decision (Chung & Ferris, 1971, p. 524; Erffmeyer, 1981, p. 79; Peebles, 1972, p. 2; Van de Ven & Delbecq, 1974, p. 605; Van de Ven & Delbecq, 1971, p. 210).

[4]A coalition is a subgroup within a group and is a temporary alliance, among two or more members of the group, oriented toward a difference of opinion regarding the means to achieve the group goals. A coalition unites certain group members who agree with noncoalition members on the nature and value of the group goal but disagree on how best to achieve that goal (Fisher, 1980, pp. 244-45).

[5]The formation of coalitions in increasingly larger groups restricts individual contributions but serves as an efficiency mechanism which gradually merges individual diversity into a subgroup and gradually merges the coalitions into the unitary whole of the group (Fisher, 1980, pp.244-45).

[6]Goldman (1979) classifies leadership styles as formal: one who is traditional, maintains the status quo, limits change, leaves little room for alternatives and assumes that individuals will respond accordingly; technical: one who encourages change, particularly of small components of methods which over time result in more far-reaching changes than those created by the formal or informal leaders; informal: one who is more open,

non-directive, and allows for freer flow of thought than the formal; he expects change but provides no preconceived parameters either qualitatively or quantitatively for individual behavior (pp. 4-5). These styles are similar to (in order) autocratic, democratic, and laissez-faire deliniated by Lewin and Lippitt (1938).

[7]Content. Content is defined as specific theoretical and technical information regarding creative problem solving processes and other areas which influence and contribute to the development of creative thinking (Focar-Szocki, 1982, p. 108). Content or knowledge of problem-solving processes was highly correlated with leader effectiveness. Transmission ability. Transmission ability is defined as the behaviors or means by which a leader conveys knowledge (content) and characteristics (attitudes) to the group. The observation and identification of specific transmission elements and behaviors was admitted by the author of the study to be the least documented category in the study. The "aspects of communication and interaction were not assessed as closely as they might have been" (Focar-Szocki, 1982, pp. 107-9). Focar-Szocki (1982) concluded that facilitation of creative problem solving is "a complex set of skills which require consideration of many specific factors . . . [hopefully] . . . we may attain increased ability to recognize, select and nurture those who will become successful in facilitation" (pp. 109-110).

[8]Norms develop through the functioning of feedback, a "mutually causal sequence of events or acts which, self-reflexively, exerts influence on the original act or event in the sequence" (Fisher, 1980, p. 333).

[9]Guidelines used in achieving consensus: "1) Avoid arguing for your own rankins. 2) Avoid "win-lose" statements in the discussion of rankings. 3) Avoid changing your mind only in order to avoid conflict and to reach harmony and agreement. 4) Avoid conflict-reducing techniques such as the majority vote, averaging, bargaining, coin flipping, and the like. 5) View differences of opinion as both natural and helpful rather than as a hindrance in decision making. 6) View initial agreements as suspect" (Hall & Watson, 1980, p. 304).

[10]An assembly effect occurs when the group is able to achieve collectively something which could not have been achieved by any member working alone or by a combination of individual efforts (Collins & Guetzkow, 1964,p. 58). Collins and Guetzkow (1964) have suggested that when groups effectively integrate the task and interpersonal concerns inherent in a decision making situation they are likely to experience increments in decision quality above and beyond that which would be expected on the basis of either the sum of individual

efforts (pooling) or the performance of a group's most skilled member. This snyergy bonus is seen as potentially available to all groups, and its achievement is limited only by the manner in which group members work together (Hall & Watson, 1970, p. 311).

[11]Nemiroff and King (1975) suggest that perhaps because their study imposed a constant time limit of forty minutes on all groups (while Hall and Watson (1970) did not) influenced the different outcomes (p. 18).

[12]Jack R. Gibb, "Defensive Communication," pp. 235-240, in Stewart, Bridges Not Walls, 1982.

[13]Benne and Sheats (1948) detail the following specific behaviors that are task oriented: 1) initiating: defines the problem, sets the rules, contributes ideas; 2) information giving and seeking; asks for or offers opinions and beliefs about their own or the group's attitude toward a suggestion; 3) opinion giving and seeking: asks for or offers opinions and beliefs about their own or the group's attitude toward a suggestion; 4) elaborating and clarifying: provides additional information about a particular suggestion or idea; 5) orienting and summarizing; review the significant points covered in an attempt to guide the direction of the discussion; 6) consensus testing: checks to see if the group is ready to make a decision (Goldhaber, 1983, pp. 268-69).

[14]Benne and Sheats (1948) denote the following as self-serving behaviors: 1) blocking: refuses to cooperate by rejecting all ideas; 2) withdrawing: remains indifferent, daydreams, avoids the topic; 3) dominating: interrupts, monopolizes conversation, is authoritative; 4) being aggressive: boasts, criticizes, fights (Goldhaber, 1983, p. 269).

[15]Among others, these sources were consulted: Miller and Rogers (1976) cited in Littlejohn (1983, p. 168); Carl Rogers, cited in Stewart (1982, pp. 176-84).

[16]The quality of feedback used as the indicator of the quality of communication was evaluated through nine factors on the Feedback RAting Instrument by Leathers: "1) deliberateness (represents a carefully reasoned, logical response; 2) atomization (degree to which a contribution involves incomplete, fragmented or disjointed thought; includes running a number of ideas together; a number of people talking at the same time; 3) fidelity (extent to which responses exhibit confusion as to the meaning or intent of a message; characterized by the necessity of seeking clarification, definition, expansion, etc.); 4) tension (degree to which non-verbal gestures like laughter, sighs, groans, etc. indicate relative state of ten-

sion or relaxation); 5) ideation (ideational responses involve an appraisal or evaluation of ideas; personal responses represent the degree to which comments involved direct or implied criticism of another person); 6) flexibility (inflexible response indicates unwilling to modify a position in response to another's contribution; may include a counter assertion); 7) digression (degree to which one person inhibits another's immediate response, primarily by means of length and discursive utterances); 8) involvement (degree to which one seeks to avoid comment on another's contribution by attempting to withdraw from the discussion of another's contribution)" (Leathers, 1971, p. 37).

[17]Problem solving effectiveness here refers to the degree to which a group adequately a) explores, clarifies and defines a problem; b) generates and elaborates solutions to the problem; c) combines and selects ideas for final solution; and d) evaluates the solution (Goldman, 1979, p. 19).

[18]Group cohesiveness in Goldman's (1979) study refers to the extent of group motivation, friendship, satisfaction, trust, cooperation and conformity in a problem solving group (p. 19).

CHAPTER III

THE RELATIONSHIP OF COMMUNICATION VARIABLES TO EFFECTIVE DECISIONS

Chapter I discussed quality and acceptance as essential dimensions in decision making. The quality dimension refers to the adequacy of the solution in terms of the objective facts of the problem. The acceptance dimension refers to the degree to which the group that must execute the decision accepts it--in other words, how does the group feel about the decision? Decision quality is often aided by problem solving methods which help deal with the intellectual aspects of the discussion. Greater acceptance occurs when group members directly influence the decision and when the decision making process meets the social and emotional needs of the group. Moreover, effective decisions are achieved more often when full attention is paid to the variables that affect communication in the problem solving group (Collins & Guetzkow, 1964, p. 88; Krueger, 1983, pp. 50-54; Littlejohn, 1983, pp. 206-7; Steiner, 1972, p. 12). However, as noted in Chapter I, most problem solving methods do not provide adequate guidelines for improving the group's manner of communication toward problem resolution.

Therefore, the intent of Chapter III is to clarify how communication toward effective decisions may be improved in the problem solving group. To accomplish this, Chapter III will discuss how each communication variable relates to the two qualities of an effective decision.

Before doing so, however, it is necessary to discuss the problem solving paradigm because problem solving methods exert an influence on decision effectiveness.

Problem Solving

Definition and Focus. Researchers generally agree that decision making and problem solving are usually portrayed as a straight line made up of formal, rational steps, each one taken after being certain of the previous step: define the problem, set objectives, gather information, identify alternatives, project consequences, choose the most propitious option (Goldberg, 1983, pp. 157-58; Hoffman, 1979, p.171; Van Gundy, 1981, p. 282; Delbecq & Van de Ven, 1971,p. 469).

Seventy-five problem solving techniques are currently available (Van Gundy, 1981) that attempt to reduce variability in leader and member behavior observed from group to group and which attempt to provide a more effective procedure for the resolution of problems (Delbecq, 1974, p. 617; Fisher, 1980, pp. 130-32). These formal approaches to problem solving, based upon specific principles and assumptions about creative thinking[1] and problem solving theory[2], are termed structured

problem solving techniques (Van Gundy, 1981, p. 2). Structured problem solving techniques are designed to solve "ill-structured" problems. (Ill-structured problems provide groups with little or no information on the one best way to develop a solution (Van Gundy, 1981, p. 4).)[3]

Stages of Problem Solving. The solving of problems is typically a five stage process as shown by a comparison of several typical problem solving formats in Figure 3.

- See Following Page for Figure 3 -

Figure 3

The Five-Stage Process of Problem Solving
Comparing Five Formats

Creative Problem Solving	Problem-Centered Leadership	Phases of Integrated Problem Solving	Hoffman	Program Planning Model
Stage 1:				
fact-finding	presentation of the problem and relevant information	problem definition	defining	problem exploration
Stage 2:				
problem finding	initial discussion of the situation	problem solution generation	specifying	knowledge exploration
Stage 3:				
idea finding	continued discussion	ideas to action	generating	priority development
Stage 4:				
solution finding	solution generalization and decision making	solution-action planning	evaluating	program development
Stage 5:				
acceptance finding	determination of decision acceptance	solution-evaluation planning	implementing	program evaluation
(Van Gundy, 1981, p. 228)	(Van Gundy, 1981, p. 282)	(Van Gundy, 1981, p.274)	(Hoffman, 1979, p.171)	(Delbecq & Van de Ven, 1971, p. 469)

Although researchers generally agree that all stages are essential in the classic problem solving process, not all available problem solving methods address every stage -- many problem solving methods are "stage-specific." For example, some problem solving methods concentrate solely on idea generation or decision analysis. However, problem solving methods can be combined depending upon the needs of the situation and the nature of the task.

Choice of Problem Solving Method. Research on problem solving methods clearly indicates that for effective decisions, the choice of problem solving technique will depend upon the nature of the problem and the conditions surrounding it (Hoffman, 1979, p. 48; Morrison & Thomas, 1976, p. 103; Stumpf, Freedman & Zand, 1979, p. 779; Van Gundy, 1981, p. 9).[4] Factors such as available time, problem scope, implementation difficulty or training requirements of group members, must be considered when selecting techniques (Van Gundy, 1981, p. 41). However, "little research is available for suggesting which techniques are likely to work best in which situations" (Van Gundy, 1981, p. 17). To help the problem solving practitioner, Van Gundy (1981) provides guidelines and a "most-useful" list of thirty-five techniques, which present a wide range of technique alternatives that should be suitable for a variety of problem solving situations (pp. 17-42). Not only are there a good number of systems for solving problems, but most of them work, given a certain type of problem and a favorable organizational

climate for the use of the specific method. If the method doesn't fit the organization's management style, problem solvers will not be as effective (Jeffries & Bates, 1983, p. 7).

The appropriate choice of a problem solving technique can lead to higher quality solutions. Furthermore, because problem solving methods prescribe varying amounts of structure for the resolution of problems, the choice of a problem solving method will exert a significant influence on the quality and acceptance of the decision. The two qualities of an effective decision require that the group must deal effectively with facts and with feelings. The intellectual aspects of problem solving activities must be handled with skill. Attention to the feeling dimensions of a decision requires a high level of confidence, trust, loyalty and candor among group members as well as loyalty to the group as a whole (Likert & Likert, 1976,p. 125). Learning to use problem solving and human relations skills simultaneously to build and maintain a group while solving a problem is necessary to reach effective decisions.

The Effect of Communication Variables on the Quality and Acceptance Dimensions of Decisions

Communication variables exert a significant influence on the effectiveness of decisions. The discussion which follows relates each of the key communication variables (discussed in Chapter II) to the two qualities of an

effective decision. Some variables may deal more with the acceptance of the decision and some may be more related to the task or quality demands. However, what is important, when discussing the relationship of communication to the problem solving process is how the communication variables relate to the two qualities of an effective decision. Each variable will be discussed, in turn, with a brief summary provided for both the quality and acceptance dimensions.

Networks

Quality. Communication networks affect the satisfaction of group members with the quality of the decision. Since full member participation utilizes group resources more effectively, patterns of communication which provide more opportunity for information, skills, experience and ideas to be shared easily and efficiently allow a more informed decision to emerge. Group discussion stimulates new thoughts and promotes combinations of ideas. This exchange and development of ideas between members increases decision accuracy and the chances that the group will come up with the best solution.

For higher quality solutions of complex problems, unrestricted and decentralized patterns of communication are desirable. While desirable for the full exploration of a problem, these patterns can draw uneven member participation. A combination of different networks during the stages of problem solving will help to achieve the inclusion of ideas from all members.

For example, members who might feel uncomfortable interacting verbally could contribute ideas and information in writing prior to full group discussion, and thus still have an influence on the solution.

Moreover, the quality of problem solution will increase if group members do not interact freely during the ideation phase of problem solving; interaction during ideation inhibits the fuller expression of ideas due to the criteria setting and evaluation that occurs when groups offer ideas and discuss them simultaneously.

The problem requirements also determine the most effective network for communication. When the problem is simple, solution quality is more easily maintained in centralized networks through speed and efficiency in transmitting information between members. When the problem is more complex, such as in most creative problem solving situations, decentralized networks will provide more member input and result in a better quality solution.

Summary. Complex problem solving situations require communication networks which facilitate the utilization of group member resources to increase the quality of solutions.

Acceptance. Group members who influence the decision or who have an opinion reflected in the decision are more likely to accept the decision. Therefore, patterns of communication which encourage participation will promote group feeling for the decision and commitment to execute the decision.

Decentralized networks foster greater cohesiveness with more participation toward group goals, have higher group morale and provide more flexibility for solution finding. The advantages of decentralized networks are optimized when precautions are taken to ensure an equal opportunity to participate.

Therefore, for group members to have a positive feeling about a decision requires: 1) equal access to problem relevant information; 2) freedom from inhibiting influences of other members; and 3) the same right opportunity and obligation to participate as any other member. Centralized communication networks offer less opportunity to participate and consequently offer less opportunity to influence the problem's solution. Hence, unrestricted or decentralized networks offer greater acceptance of the decision when solving complex problems.

Summary. Member acceptance of the group's manner of communication about a problem and its solution is increased when networks ensure the opportunity to influence the solution.

Small Group Ecology

The variable of small group ecology (seating arrangements) affects the group acceptance dimension of an effective decision more than its quality dimension.

Quality. Seating which increases the perception of status differences among members of the group generally has a negative effect on the quality of decisions. Because

a central figure has more status, this figure both receives and gives more communication. Other members of the group may participate less as a result of a perception of less ability to influence the solution. To negate the notions of status associated with seating, seating members to encourage equality of participation (e.g., a circle) will increase the amount of information contributed toward the problem and also increase the quality of the solution.

Communication in the group is affected by seating arrangements. Members who choose a seat as far away as possible from others lessen the chances of being expected to contribute. Fewer contributions can impair the quality of solutions through under utilization of member resources. Where people choose to sit in a group also determines with whom they communicate in the physical proximity and this exerts an influence on the communication patterns in the group.

Summary. The satisfaction of group members with the quality of solution is increased when the seating arrangements of members promotes participation and decreases member status differences.

Acceptance. Since full discussion and participation leads to greater acceptance of the decision, seating should be arranged to foster the desirable interpersonal communication qualities which enhance a group climate for participation. Freedom to participate and cooperate, group harmony, friendliness, warmth and informality--are enhanced by close sitting within

good eye contact. The more formal and distant the group seating the more formal and distant and cool is member communication. Good eye contact results in more communication between group members and between group members and the leader. There are less member contributions when group seating is the typical school room style where members look at each other's backs and not at each other's eyes. Circular seating arrangements facilitate eye contact and at the same time can help negate status positions if a group does not want or need a leader. Since more conversation is directed towards those who occupy a central position, the members to whom less conversation is directed will feel less support for the decision as a result of less opportunity to influence the solution.

Group members who regularly meet gravitate to a usual seat. If another member takes that seat, negative feelings toward the person who assumed another's usual seat may result and reflect negatively on the quality of ensuing communication. Such feelings become dysfunctional hidden agendas and interfere with the solving of problems and acceptance of the group process.

Too close or too far seating between members may evoke negative personal feeling in participants which negatively affects the quality and content of communication about the problem, leading to less support for the final decision. If groups desire strong leader guidance, seating should

be arranged with all eyes upon the leader; members need have little eye contact and physical closeness with other members. A central focus for communication may be desirable at some stages of the problem solving process or for certain problems. However, for greatest acceptance of the decision, seating which encourages perception of member responsibility to contribute toward problem resolution is desirable.

Summary. To encourage participation and to increase acceptance of the decision, group members should be seated in close proximity and have good eye contact with all other members.

Group Size

Group size significantly affects the quality and acceptance of a decision.

Quality. The quality of a solution is generally positively associated with increasing group size because more member resources are available for dealing with the problem. However, for the following reasons, the quality declines in proportion to the group's inability to utilize member resources. 1) With increasing group size there is less time for each member to contribute--the pattern of communication begins to vary in the group, affected by the formation of coalitions and subgroups. This allows less direct input from the members and therefore utilizes less individual resources. 2) As groups get larger, more time is spent communicating on leadership, procedural tasks and group maintenance, leaving less

time and energy for solution. 3) As group size increases, the probability of leader emergence increases. Leader emergence tends to centralize the communication patterns which in turn allow less influence on the solution by other members.

The quality of the solution also depends upon the size of the group in relation to the nature of the problem. While a complex problem is best handled by a decentralized message flow, as the group size increases, communication patterns become more centralized and become less effective for complex problems, resulting in lower quality solutions.

Summary. As group size increases, more member resources are available to increase the quality of decisions. However, larger group size is an advantage only if measures are taken to ensure the effective utilization of member skills, ideas and experiences through opportunities to participate.

Acceptance. Group size affects the group's manner of communication toward the problem solution. Smaller groups tend to inhibit the expression of disagreements and disatisfaction more than large groups: less freedom to differ in opinion leads to less acceptance of the decision. However, smaller groups allow more opportunity to communicate and hence influence others. Since the opportunity to interact and influence a solution is directly related to acceptance of the decision, a smaller group size is more conducive to acceptance.

As groups increase in size, cohesiveness and morale decrease due to the development of coalitions, factions

and an increase in organization and division of labor in the group. Cliques and factions develop from a need for group efficiency but result in less opportunity for each member to influence the solution directly. The patterns of communication begin to change with coalition formation. Increasingly larger proportions of the group are discouraged from making overt contributions because members must work through subgroups and factions in order to have an influence. The ability to directly influence the group process toward problem resolution leads to less acceptance of the decision. Further, the total amount of participation in the group and from individual members decreases with increasing group size. Less participation leads to less influence and consequently, less support for the decision.

However, problem solving techniques can compensate somewhat for the disadvantages associated with larger group size. Different communication patterns can be used to provide greater opportunity for participation and thus increase the potential for member influence on the decision.

The nature of a problem will influence on the solution is directly related to higher acceptance of the decision; therefore groups of all sizes must provide procedures for the equal opportunity to participate.

Individual Versus Group Problem Solving

Individual versus group problem solving is a communication variable which appears to affect solution quality more than

acceptance.

Quality. Group superiority over that of individuals in problem solving is attributed to more available ideas and fuller discussion of problems. The group draws from individual ideas, forms a repository of these ideas, then subjects these ideas to an examination from varied perspectives, backgrounds and experience. When group members discuss ideas there is a greater likelihood that false assumptions and errors will be detected during the exchange of information and result in an increase in the quality of the solution.

Group superiority over that of individuals in problem solving will also be enhanced by the selection of member resources appropriate to the problem. For example, physicians would be a good choice of group member resources to solve a health care service problem. Moreover, group problem solving solutions will be of higher quality than that of individuals when member resources of the group can be tapped for problem solution. However, group resources, time, and energy devoted to group maintenance problems leaves less time and effort available for problem resolution. If problems associated with group maintenance can be resolved, group interaction for solutions is superior to individual problem solving.

However, individuals are more effective than groups in the ideation phase of problem solving. Group discussion following individual ideation is essential. The sharing of information and hitchhiking of ideas allows a solution

to emerge that is better and more creative than an individual working alone. In addition, the sharing and exploring of ideas about problems results in the group sharing responsibility for the decision.

Summary. Groups provide advantages of more ideas, information and expertise about a problem. Group discussion explores more problem aspects which increases the likelihood of better quality solutions. However, these group advantages will decrease in proportion to the amount of group effort which must be devoted toward maintenance of group relations and thus away from problem resolution.

Acceptance. Member support for group decision making will result only when the member feels that the rewards provided by association with the group are greater than solving the problem individually; or if the individual feels that the group can solve the problem better than the member could alone. Whether a group solves a problem more effectively than an individual depends upon the quality of group member resources. An individual may be superior to the group in problem solving if the group membership is not adequate to the task and solutions do not gain quality by member interaction. A member in such a group will have less acceptance of the decision.

The quality of communication toward the problem and the effective resolution of group maintenance problems will directly affect the acceptance of group decisions. A lack

of group membership skills interferes with good communication and prevents groups from fully utilizing member resources, leading to lower quality solutions as well as less acceptance. Struggles over status, lack of participation, domination of the discussion, expressions of hostility and apathy, all serve to leave group members disappointed in group process as well as less support for the decision. Support for the decision can be increased when group members are trained in desirable behavior for group communication, promoting group goals over individual goals. One of the best reasons for having a group solve a problem is to seek group support for that decision. Moreover, solutions which reflect member influence will increase the motivation to carry out the solution.

Summary. A decision will be supported more often when: 1) members perceive solution quality is greater than that which could have been achieved individually; 2) the member is able to participate to influence the solution; and 3) problems associated with the group communication process for maintenance are resolved.

Leadership. Leadership is a variable to communication that greatly influences both the quality and acceptance of decisions.

Quality. The capacity of the problem solving group to develop new, innovative solutions to difficult problems is dependent upon the diversity of group members in background,

experience and point of view. If it is assumed that problem solving group leaders have final responsibility to move the group toward completion of the task, the extent to which the leader utilizes the resources of the group will directly affect the quality of the solution.

A leader will utilize group resources toward higher quality solutions more often when: 1) the leader's communication and behavior fosters an equalitarian climate of openness and opportunity to contribute; 2) the leader assumes responsibility for accurate communication between members (is sensitive to unexpressed feelings, protects minority viewpoints, keeps the discussion moving, and skillfully restates group views); 3) a leader demonstrates confidence in member ability and judgment to solve the problem; 4) a leader communicates actively, freely and frequently with group members to tap individual skills and knowledge; and 5) a leader facilitates communication which reduces misunderstanding.

Higher quality solutions result when the leader-member relationship is good. A good leader-member relationship allows more time to be devoted to the task and less time to developing or maintaining the relationship. More quality decisions result when the leader communicates a wish to share and delegate authority and power with the group--moving to become a member whose skills and resources are available to the group.

A leader also contributes to the quality of a solution by: 1) using an appropriate problem solving method for the

problem; 2) having skill and knowledge in the use of the problem solving method; and 3) making sure that all relevant information is available and used effectively.

Higher quality decisions are reached when a leader regards the differences of opinion as a cherished value, regards conflict as an opportunity for better solutions, and helps the group to deal with such divergency creatively and constructively. Groups need to value dissenting opinions as essential contributions to innovative and excellent solutions; therefore, a leader must facilitate and support the contributions of all members.

The personality and attitude of the leader toward the group also influences the quality of the solution. An authoritarian leader style does not encourage free and open group communication. Group members perceive that the authoritarian leader will most likely overrule the group's handling of the problem. As a result, less member participation and effort may be put into solving the problem.

Summary. Higher quality of a solution occurs more often when a leader maximizes the resources of group members by using good interpersonal communication and problem solving skills with the group toward problem resolution.

Acceptance. The key to quality solutions is the utilization of group member resources. A leader who facilitates such utilization contributes to member acceptance of the decision.

Increased support for a decision results when a leader fosters a supportive and open climate by receptivity and desire for candid and unguarded personal communication between members. Moreover, positive feedback by a leader to members about the quality and amount of contributions helps members feel good about the way the group solves the problem. When leader skill helps groups to achieve higher quality solutions as a result of effectively and creatively dealing with conflict in the group, group members feel a sense of accomplishment and have increased support for the decision. Moreover, the group's confidence in the solution will support its implementation.

For the greatest acceptance of the decision a leader must succeed in having members feel that specific individual skills, feelings and experiences have been sought, tapped and incorporated into the solution. Members feel better about decisions when a leader: 1) is sensitive to expressions of feeling and communicates a desire to acknowledge them; 2) is person-oriented more than task-oriented; 3) relies on the desires of group members as the motivational force in the group; 4) moves to become a member of the group (not seeking status which removes the leader as a member of the group); 5) communicates an ability to deal easily with the social and emotional needs of members; 6) does not exhibit an authoritarian manner and 7) displays friendliness, confidence and trust to the group.

Summary. Members have increased support for the decision and motivation to carry out the decision when a leader provides a climate which fosters the incorporation of member skills, feelings and ideas into a solution and when a leader helps the group find a successful resolution to conflicting points of view.

Conformity

Pressure to conform directs the communication of group members toward the solving of a problem. Since groups seek success, some degree of conformity is necessary to achieve problem resolution.

Quality. Group members interact in ways that mesh individual goals with the norms set by the group. The quality of a solution is affected by the extent of commitment to group goals that a member evidences and by a willingness to contribute skills and other resources. Members who conform and communicate with each other on the basis of norms adopted by the group do so because the norms are perceived to benefit and reward the successful performance of the group's problem solving efforts.

However, the pressure to conform can be detrimental to the quality of group solutions when different and divergent opinions are not encouraged and are instead viewed as threatening to the adopted norms of the group. Therefore, groups which adopt norms to encourage divergency of opinion will have higher quality solutions. Pressure toward conformity can

also be negative when conformity causes the ideas submitted to be aimed more at achieving group approval than at offering communication or ideas which will help the quality of the solution.

Summary. The extent to which group pressures for conformity enhance or hinder communication toward quality solutions affects member satisfaction. Higher quality solutions result when members conform to a group norm which encourages diversity of opinion.

Acceptance. Group goals must reflect the values of group members. Acceptance of the decision will be lower if the group has norms which members do not share. Members who superficially adopt group norms as a result of group pressure to conform may participate under the influence of hidden agendas, resulting in hostility, withdrawal and other norms of noninvolvement which result in less member acceptance of the decision. Member feeling about a decision will also vary to the degree that the needs of an individual are met through conforming to group goals.

Summary. Communication based on conformity to norms adopted and shared by group members leads to the increased motivation of group members to carry out the decision.

Conflict

The manner in which problem solving groups deal with conflict determines the quality and acceptance of the decision.

Quality. When a group seeks quality solutions, differences of opinion may either be a serious liability or a great resource, depending upon whether the diversity immobilizes the group in "win-lose" conflict situations or stimulates creative thinking and the use of member resources toward solutions. Higher quality solutions will be achieved more often when: 1) group members feel free to and do express differences of opinion; and 2) group norms encourage the expression of dissenting opinion. These two conditions give members confidence that decisions have higher quality because more aspects of the problem were explored.

Qualitatively superior and more creative solutions result when groups adopt a "working-through" approach to the handling of divergent opinions. Training in group membership behavior and consensual guidelines helps members: 1) to communicate more supportively and less defensively; 2) to feel more comfortable in expressing and accepting divergency of opinion; and 3) to promote group goals over individual goals.

Higher quality solutions result when the group relies on its member resources to work through conflict and does not expect a leader to "rescue" the group from conflict and make arbitrary decisions. The group has the necessary resources for solving problems.

Summary. Higher quality decisions result when groups regard and promote conflict as a creative force and as an

opportunity for fuller exploration of a problem.

Acceptance. Conflict situations can increase acceptance of a decision when all members listen attentively and supportively to each other and when members place a positive value on diversity, dissent and differences. Communication then becomes more open, candid and free. Freedom to express opinions influences the solution and therefore results in higher satisfaction with the solution.

Exploring conflicting opinions takes more group effort. However, groups who seek solutions to problems by working through conflict, will have greater satisfaction with the decision than groups who rely on leader solutions. Less commitment to solutions occurs when leaders preempt the right of a group to solve the problem and determine its solution.

Summary. Increased acceptance of decisions occurs when group members feel good about the decision and about the manner in which the group integrated divergent opinions into a high quality, final solution.

Functional Dimensions

Task and Self-Serving Behaviors. The influence of the task dimension on the quality of a decisions is strongly determined by the choice of problem solving method employed. Because communication directed toward the technical quality of a solution is largely determined by the problem solving

method, this paper presumes that problem structures will provide guidance. However, the quality of that communication is affected by the key variables discussed previously in Chapter II.

Self-serving behaviors affect and are affected by the manner and quality of communication in the group. However, this paper does not specifically address the effects of dysfunctional self-serving behaviors on communication but provides insights toward maintenance dimensions which may alleviate some self-serving behaviors.

Maintenance. Communication towards maintenance problems serves to "lubricate" the process of problem solving. Certain communication behaviors are critical to maintaining a healthy group climate in which creative problem solving can take place. Communication behaviors which resolve differences and reduce tension, encourage and support, exhibit awareness of feeling and facilitate the flow of communication, will facilitate the achievement of more effective decisions. Therefore attention must be given to communication variables which help maintain a healthy group climate.

Cohesiveness

Quality. While a feeling of groupness is necessary to accomplish a task, groups can become so cohesive that no deviance of opinion or ideas is allowed. Excessive cohesiveness relates negatively to the quality of group solutions. When

the need for group cohesiveness becomes more of a value than the need to achieve a quality solution, cohesiveness will inhibit the presentation of different points of view which are necessary for higher quality decisions.

However, up to a certain point, cohesive groups do make better quality decisions because groups with high loyalty are more likely to be motivated by common values and goals than groups lacking such cohesiveness. Highly cohesive groups make better decisions because members: 1) communicate and interact with each other more; 2) have more friendly and cooperative communication; and 3) exert influence on each other toward a common goal.

Summary. A highly cohesive group which allows for divergency of opinion, provides for increased satisfaction of group members with the quality of decision.

Acceptance. Acceptance of a decision is facilitated by a highly cohesive group. Communication in a cohesive group focuses on the goal of arriving at solutions with group support for doing so. A supportive climate where members can freely contribute and participate increases group support for the decision.

Cohesiveness is communicated as an attitude and is also a relationship between members. Cohesiveness will vary depending upon the extent of group motivation, friendship, trust, cooperation and conformity which is felt and displayed in the group and upon other positive maintenance

factors which work toward the feeling of groupness.

Summary. The presence of positive maintenance factors will contribute to cohesiveness and provide conditions which foster support for a decision.

Trust

Problem solving groups produce more thoughtful and innovative solutions when ideas are fully shared, especially when group norms reward individuals for voicing possibly deviant opinions. Freedom of expression can occur only when a trusting climate prevails. A trusting climate influences all interpersonal communication in the group and greatly affects the quality and acceptance of a solution.

Quality. High levels of trust between group members provides a nonexploitive climate where communication is free, open, frank, spontaneous and uncalculated. With low levels of trust, members may try to outsmart or outmaneuver each other, and may not communicate true feelings, opinions, ideas and information which are required for better quality solutions; energy and creativity is diverted from work toward solutions. Hence, the quality of decision suffers.

When the group climate causes opinions to be disguised or tempered, group members become defensive. Defensive members may withdraw, thereby reducing commitment and communication necessary toward the group goal of finding a good solution. In a defensive group climate, members may perceive that the decision did not benefit from all possible ideas as

a result of less group support for member participation. Less satisfaction with the quality of the solution may result. Members may rightly assume that if more ideas had been presented in a more supportive climate, the solution could have been better.

Summary. High levels of trust leads to higher quality solutions by providing supportive conditions receptive to divergency of opinion and full participation of group members; more member involvement contributes to higher quality solutions.

Acceptance. The level of trust present in a group directly affects the level of acceptance a group member feels with the decision -- high levels of trust increase acceptance. When group members can rely on each other to receive each others' ideas and opinions as needed and wanted for solution, the motivation of a member is to continue to share ideas. As more trust is experienced, more trust will be mutually reciprocated, leading to fuller communication toward the problem and greater support for the decision.

Low levels of trust and a negative experience with the lack of trust leads to: 1) a decrease in the amount of open communication; 2) a stifled group climate; 3) member hesitation to reveal information; 4) defensive and closed communication; and 5) reduced cohesiveness of the group.

Moreover, members need to trust that others will carry out an assigned responsibility. Lack of trustworthiness will create negative feelings between group members and

negatively affect the quality of future communication.

Summary. Unconditional acceptance of others' opinions as being valid, favors trust between members and promotes a willingness in members to offer more contributions. Contribution of ideas and group participation increases a member's felt perception of influence on the solution, leading to increased motivation to support and carry out the decision.

Feedback

Feedback communication related to task and maintenance problems serves to clarify and provide understanding of the communication in the group. When members communicate about a task, a relationship dimension is also present in the message.

Quality. Explicit and direct communication concerning the task elicits more relaxed and clear responses. Less clear and ambiguous comments do not provide as much help for members to work on the solution to the problem, hence the quality of solution suffers. Feedback which exhibits good human relations awareness will promote understanding between group members during problem solving discussions. Therefore, the quality of solution is affected by the quality of feedback.

Summary. Solution quality is higher when communication between members about a problem is direct, clear, relevant and seeks to increase mutual understanding.

Acceptance. Positive feedback can help a group to feel good about a decision. Group members will be more supportive of a decision if communication toward the task is clear, open, candid and direct, and is not manipulative.

A group needs positive feedback from others in the group, from the leader and from the larger organization in the group's environment to reinforce what the group is doing well. Members need to know that the group is serving a vital function, that the group needs the skills and experiences that members have to offer, and that member contributions serve as a necessary function in the group. Feedback directed thusly, reinforces positive group efforts and provides members with feelings of influence on the decision which is necessary for member acceptance of the decision.

Summary. A mutual willingness on the part of group members to clarify positions and statements with clear and direct communication will increase acceptance of the decision. Positive leader feedback to members about their contributions will also promote member motivation to carry out the decision.

Cooperation

Cooperation is a reciprocal relationship in a group whereby each person influences the system and accepts influence from it.

Quality. The quality of a decision is higher when members of the group agree on and communicate toward the

same goal. Greater member commitment to agreed-upon goals results in more communication efficiency toward achieving that goal and higher quality of the decision.

The quality of a decision is also affected by how effectively the group communicates and organizes to achieve problem resolution. The more cooperative members are in the use of group resources, the more effective the decision.

Summary. Members of a cooperative group achieve higher quality decisions because more communication is directed toward an agreed-upon goal.

Acceptance. A cooperative agreement on the part of members of a group to mutually participate to achieve a solution to a problem results in direct individual influence on the solution, favoring support for the decision. Cooperative groups are characterized by more positive interpersonal communication than are competitive groups. Group members feel more comfortable communicating in a cooperative group climate. Moreover, supportive group behavior toward deviant member opinions fosters cooperative relationships among members and contributes appreciably to resolving conflicts amicably, resulting in better group process.

Summary. Both groups and individual group members gain in cooperative situations. Through participation, group members gain influence on the decision, thereby increasing acceptance for the decision. Decision quality is improved as a result of the greater amount of information that has

been contributed toward a problem and its resolution.

Gatekeeping

Gatekeeping is an individual group member responsibility to help facilitate participation in the group.

Quality. Solutions of higher quality result when more member ideas and group resources are reflected in the decision. Therefore, groups whose members strive to facilitate the participation of all members will encourage a greater exchange of information about the problem. Gatekeeping also has a subjective dimension: group members must decide what, when, how and to whom information should be relayed or shared. Ethics and judgment require that group members share information about a problem fairly and fully for best quality decisions.

Summary. For higher quality solutions, group members and leaders should facilitate group communication and involvement toward problem resolution.

Acceptance. The extent to which and how well a group keeps communication channels open for member participation toward a problem will determine how group members feel about a decision. Since greater acceptance of the decision results when members directly influence the solution, it is important that each group member seek out and encourage the contributions of all group members.

Summarty. Gatekeeping is a desirable concept that can increase the acceptance of a decision by facilitating

participation from all members in the problem solving group.

SUMMARY

Communication between problem solving group members determines the two essential dimensions of an effective decision: satisfaction and acceptance. Problem solving methods can provide steps to help achieve satisfaction with the adequacy of the solution in terms of the objective facts of the problem. No such practical steps are available which increase the acceptance that group members feel for the decision.

However, the above discussion of how communication variables influence group communication to reach effective decisions can be applied to problem solving groups to increase both the quality and acceptance dimensions. Each variable has unique concepts and characteristics which affect decision quality and acceptance. While the discussion of how communication variables affect decisions requires focusing on variables one at a time for purposes of study, a practical application of that study recognizes the overlapping and interacting nature of communication variables in real-life situations and problems.

Endnotes

[1]Wallas (1926) posed the basic paradigm for creativity: preparation, incubation, illumination and verification (pp. 80-107).

[2]The majority of textbooks and manuals have recommended modifications of Dewey's formulations as patterns for group problem solving discussion. "Most of these patterns closely approximate the following: a) defining and analyzing the problem; b) establishing criteria by which to judge proposals; c) finding possible solutions, or the generating of proposals; d) evaluating proposals in order to reach a decision; e) planning how to put the final solution into effect" (Brilhart & Jochen, 1964, p. 175).

[3]Problems can be classified according to their degree of structure: well-structured, semi-structured or ill-structured. A well-structured problem is a situation typified by its routine, repetitive nature and can usually be solved using standard operating procedures. A semi-structured probem is characterized by some knowledge of the solution but unsureness of how to solve the problem. An ill-structured problem provides the problem-solver with little or no information on the one best way to develop a solution (Van Gundy, 1981, p. 4).

[4]Research results demonstrate that decision effectiveness results from the interactions among group members, group functioning and the decision situation. When using a judgmental decision making group, 1) less effective decisions are the result when the decision does not require member acceptance; 2) when a decision requires quality and originality, interacting groups are likely to recommend less effective decisions; 3) when a decision involves a solution outside the workers ordinary expertise, the quality of the decision is less effective; 4) when experts external to a situation are consulted, and when the decision requires acceptance, the decision is less likely to be effective; 5) when the decision requires acceptance but not originality and intragroup conflict is expected, nominal groups are likely to recommend less effective decisions, based on the decision criteria of quality, acceptance and originality (Stumpf, Freedman & Zand, 1979, pp. 779-80).

CHAPTER IV

SUMMARY AND CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Summary and Conclusions

Communication provides the means by which problems are discussed and solved in problem solving groups. Communication must provide satisfactory resolution of problems and at the same time meet the social and emotional needs of group members. While problem solving methods can provide steps for the successful resolution of problems, no such practical guidelines are available for how groups can communicate to achieve effective decisions.

An effective decision has two essential dimensions: quality and acceptance. The quality dimension refers to the adequacy of the decision in terms of the objective facts of the problem. The acceptance dimension refers to how the group members feel about a decision. High quality and high acceptance are both needed for effective decisions. This means that group discussion must effectively deal with both facts and feelings. When full attention is paid to the variables that affect group communication during problem resolution, effective decisions are achieved more often.

Variables that affect communication in problem solving group are: networks, small group ecology, group size, individual versus group problem solving, leadership, conformity, conflict and the functional dimensions of task, self-serving behaviors and maintenance.

This study analyzed the research concerning the relationship of communication variables to the two qualities of an effective decision and reached two major conclusions: 1) the key to effective decisions is the utilization of group member resources by seeking the participation of all group members in the problem solving process; and 2) some communication variables have a more significant effect than do other variables on member participation.

The first conclusion is supported by the works of Steiner (1972) and Rohrbaugh (1979). Utilizing the resources of the group through all-member participation allows more skills, ideas, knowledge, experiences and judgments to be applied for problem resolution. Higher quality and more informed decisions are the result. At the same time, all-member participation provides direct influence on the solution which leads to greater acceptance of the decision. Member opinions and feelings reflected or incorporated in the solution also increase member acceptance and commitment to support and carry out the solution.

The second conclusion involves a discussion of the significance of the communication variables to group

participation. Some variables, more than others, have greater impact upon problem solving group communication and provide more insights into the communication process necessary for effective decisions. Based on an analysis of the research, this study concludes that four communication variables are more basic than others in significantly influencing participation and consequent decision effectiveness: communication networks, trust, feedback and leadership. These four communication variables "set the stage" and are the basic paradigm for the interplay of the other variables.

1) Because communication networks prescribe who can talk to whom and when, networks set the basic parameters for communication in the problem solving group. After all, message flow must ensue for the other communication variables to impinge upon group process. Therefore, the clear expectations and results derived from research on the various patterns of communication should be applied to problem solving situations to create opportunities for more equal participation. Leaders and problem solving group methods that prescribe patterns of communication can create conditions conducive to effective decisions by ensuring equality of opportunity for participation.

2) High levels of trust are pivotal and basic to group participation and lead to higher quality decisions that have greater acceptance. "Trust is a key factor which will influence the group problem solving process" (Krueger, 1983, p. 25). Trust as a communication variable interrelates

with and influences all group communication, especially toward cooperation, conformity to group goals, groupness and the creative use of conflict. Trust implies mutuality--a felt perception of a supportive relationship between group members that connects members with one another and with the goals of the group. For example, trust between group members is essential for support of group norms which encourage differences of opinion: "I trust that I can differ from you in my opinions and not be rejected because we both have a common understanding that diversity of opinions leads to higher quality and more creative solutions." Without adequate levels of trust, effective decisions will not be reached, no matter how theoretically sound the problem solving method, how insightful and well-planned the facilitation of patterns of communication or how devoted the leader.

3) Feedback is a basic and significant communication variable that serves as the "vehicle" for the total group effort in interaction. High quality interpersonal communication and content of feedback between group members will facilitate the human relations and intellectual elements of group process to reach effective decisions. Positive, clear, relevant and direct feedback provides the means of reciprocating understanding and trust between group members.

4) The relationship of leadership as a communication variable to effective decisions is unique. While all communication variables interrelate and are interdependent

to some degree, leadership exerts more influence upon the other variables because the position of leadership carries authority, power and status. Leaders can strongly determine the success of a problem solving group to reach effective decisions: leaders can make decisions concerning the choice of problem solving method, size of the group, patterns of communication and in many other ways influence the quality and content of communication in the group. For instance, trust tends to be reciprocated. Therefore, leader initiation of trusting behavior will encourage reciprocal member trust. Similarly, positive feedback communication by the leader works to increase cooperation and cohesiveness; the skillful handling of conflict by a leader promotes openness and trust and encourages the further expression of divergent opinions.

With leader authority and status comes responsibility. Research clearly recognizes this responsibility, relating group effectiveness to the characteristics and behavior of the central figure in the group. The implications of this responsibility to effective decisions requires that leaders skillfully utilize member resources by the application of good group communication and problem solving skills. While research sometimes conveys the impression that "the group can do it all" real-life situations usually need leaders to take responsibility for moving a group to final, effective decisions.

In summary of the significant variables, networks

are the base from which communication is structured to take place; trust provides the supportive climate necessary for risk taking and sharing between members; feedback is the means by which understanding and trust is increased and problems are resolved; and leadership greatly influences the interaction of all the variables.

Less significant observations result from the study of the remaining communication variables. Basic considerations such as where members are seated and group size, once determined, can be dismissed as a concern. Seating members in a circular or U-shaped arrangement in close proximity and within good eye contact, demonstrates an effective utilization of the research about group seating arrangements for the encouragement of participation. The effects of group size on reaching effective decisions can be simply stated: group member size of five seems ideal for solving most problems and provides participation opportunities. Typically problem solving methods involve somewhat larger groups to increase the resources available for solving the problem. The larger the group the less opportunity to participate. Therefore, problem solving groups need to rely on leader skill to ensure equality of opportunity for participation or need to structure varying patterns of communication during problem solving to facilitate member influence on the solution and utilize member resources for higher quality decisions.

Group interaction can lead to higher quality decisions

than those of individuals if the dysfunctional problems associated with group interaction can be minimized. Higher quality decisions and good group feeling about the decision results when member resources are suitable for the problem, members have equal opportunity to participate and the group exhibits desirable communication behavior.

The implications of the research on conformity and cooperation are fairly straightforward: norms which reflect group values will promote communication and commitment for more efficient and effective decisions. Therefore, the problem solving group must initially assume some basic housekeeping tasks of agreeing upon group goals and achieving consensus on the group's manner of communication. For example, group norms which regard conflict as a cherished value from the basis for a common understanding to deal creatively with differences. The successful resolution of conflicting points of view is a source of satisfaction leading to greater acceptance and also results in more creative and higher quality solutions. An essential motto for any group interaction is to not confuse disagreement with dislike.

It appears that cohesiveness is a result of cooperation and conformity by group members to group goals and norms. For more effective decisions, groups need cohesiveness but also must have norms that encourage diversity of opinion.

Task as a variable will determine the problem solving method used and the resources needed for problem resolution.

The skill of group members and the leader in using the problem solving method will determine the influence that the task has upon the decision quality. Self-serving behaviors are clearly dysfunctional to effective decisions in problem solving groups. Training in group membership skills is recommended.

This paper reached further conclusions regarding the study of communication in problem solving groups. Research tends to regard variables as entities--each variable standing alone in order to be studied. This separating of communication phenomena for study, though unrealistic, has its advantages and limitations. While separating each variable from the communication process is convenient for study, there is a tendency to regard them as just that: standing by themselves. A major point of this study is to emphasize the interrelationship and interdependence between communication variables to create a total climate of problem solving group communication. The relationship of communication variables to effective decisions needs to be considered through the General Systems framework--that a change in one part of the system affects every other part in the system.

An additional observation concerns the selection of Goldhaber's (1983) classification of key variables as the means to discuss the effects of communication variables in problem solving groups. The framework has certain limitations. For example, trust, feedback, cohesiveness and cooperation were areas of study revealed by the literature search

but these areas were not specifically included in Goldhaber's framework. However, while all frameworks consulted for discussing group communication variables had limitations, Goldhaber's framework provided the flexibility to include the above mentioned areas of study.

Also absent from Goldhaber's framework was the inclusion of nonverbal communication as an important variable. Nonverbal communication is important because it can reinforce the content and relationship dimensions of a message or it can give mixed messages when nonverbal communication disagrees with the content dimension of the message. However, the absence of nonverbal communication as a variable was noted in all frameworks consulted for discussing variables to communication. In addition, nonverbal communication was rarely mentioned in the research on communication in problem solving groups.

Moreover, it should be noted that Goldhaber (1983) placed the problem solving group in the context of an organizational setting which may have influenced the selection of the key variables. For example, whether an individual or a group should solve a problem is a consideration for the organization in terms of money, time and talent. However, the major impact of the variable (individual versus group problem solving) on the communication toward effective decisions, involves concerns associated with the selection of group members and problems of group interaction.

This paper recognizes that more than just an intellectual explanation is needed in the analysis of the effects of communication variables on group communication. Communication includes more than "variables." What is missing from the research are the various qualities, nuances and joys found in communication that lend grace or smoothness to conversation, such as the use of tact, or the tone or quality of voice which conveys warmth, genuineness and empathy. Another quality missing from the research is humor. As most group members have experienced, humor serves to release tension. The judicious use of humor by group members and leaders in a timely fashion can be extremely effective in pricking the balloon of seriousness and tension which may accompany problem solving.

Finally, problem solvers--group members and leaders--must seek experience in solving problems and test the effectiveness and validity of the findings of research. Intellectual knowing is not the same as doing--problem solvers must seek situations where communication skills can be practiced for achieving effective decisions. The final conclusion of this study is that while problem solving methods provide rational steps for the solution to problems, the maintenance of high quality relational communication in a positive group climate is the strongest influence on reaching effective decisions.

Implications

The varying impact of self-serving behaviors is essentially an unknown dynamic operating in any group and will affect the quality of communication between members. While attention to maintenance variables can alleviate some self-serving behaviors, training in group membership skills and in consensual guidelines will allow groups to reach effective decisions more consistently.

Various other factors would appear to affect decision success and communication of problem solving groups: previous group history, organizational setting, aesthetic conditions of the meeting room, comfort of seating, noise, warmth or coolness of the room, length of meeting and whether it is time for lunch! Each factor could relate negatively or positively to the quality of communication and decision making.

Some consideration must be given to member qualification for tasks resolution. Since the resources of the group determine to a significant extent the quality of the solution, are there some instances when no preconceived ideas, experiences or skills related to the problem could conceivably increase the quality of solutions?

While research has established a need for balance between attention to task problems and attention to interpersonal relations, is this "balance" necessarily applicable in heavily task-oriented environments? In other words, can problem

solvers always assume that at all stages of the problem solving process that a balance is needed between the social and emotional and task factors? Flexibility could be the key--too much leader attention to the "feeling" needs of group members and not enough leader attention to the task could result in the sense that no one is "in charge." This can result in a climate that leads to a devaluation of the task and of the group as an entity (Harper & Askling, 1980, p. 98).

Problem solving methods must be selected for situational requirements. Research reveals that most problem solving methods work. However, problem solving practitioners must realize that there is no one, sure-fire problem solving method that will do the job for all situations. No problem solving method is in and of itself perfect. Problem solving methods are ideal, theoretical structures, but when used by groups are subject to many variables. For most effective decisions, problem solving group members and leaders need an understanding of the basic problem solving steps and a strong understanding of communication skills necessary for group interaction. These two sets of learnings can then be applied to any problemsolving situation to reach effective decisions.

Further Research Recommendations

Further research, similar to the study by Focar-Szocki (1982), is needed to determine the interrelationship between leader qualities, group communication process and problem solving structures. A challenge for research is to provide more definitive guidelines for leaders. For instance, what attributes are necessary in the personality of the leader? What balance does a leader need between a concern for task and a concern for interpersonal relations and still have group members feel that someone is "at the helm?"

This paper found a continuing concern expressed in the research literature for the appropriateness of problem solving technique to the problem situation. Research also is needed on the relationship between the nature of the problem and the amount of quality and acceptance required by the solution to the problem solving process utilized (Miner, 1979, p.92; Erffmeyer, 1982, pp. 83-4).

While communication variables affect all problem solving stages, do some communication variables exert greater influence at some problem solving stages than at others? Research on communication variables and the social and emotional aspects relevant for different stages of the problem solving process may reveal that different variables may be operating within each stage.

Further research is suggested to analyze the research on communication in problem solving groups through the

variables that this paper found most significant. Other research could be undertaken to regard networks, trust, feedback and leadership as significant variables and structure an analysis of problem solving group communication to test the conclusions of this paper that these four variables are the most significant for effective decisions.

Lastly, the research consulted reflected small concern for nonverbal communication in the problem solving group. Further research is recommended to determine the relationship of nonverbal communication to decision effectiveness, especially to the acceptance dimension.

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