

THE EFFECTS OF LEADERSHIP STYLE ON SOME ASPECTS
OF GROUP GROWTH

Dissertation for the Degree of Ph. D.

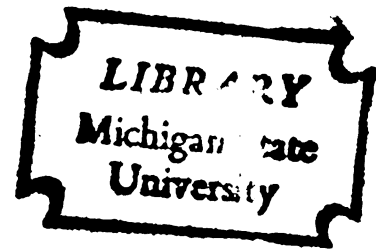
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ABSTRACT

THE EFFECTS OF LEADERSHIP
STYLE ON SOME ASPECTS OF GROUP GROWTH

By

Stuart Lee Ralsky

The effect of varying styles of supervisory behavior has been an area of increasing concern to organizational psychologists. Studies of participative and authoritative leadership have primarily focused on differential effects in terms of productivity and satisfaction. These examinations have tended to overlook the effects of leadership style on the development of work groups which is viewed in the participative model as an intervening process that ultimately leads to increased organizational effectiveness. This dissertation examines the relationship between supervisory style and a number of indices of group growth. It was hypothesized that groups led by participative leaders would have significantly higher levels of growth than groups led by authoritative leaders.

Sixty-one male undergraduate subjects were assigned to sixteen groups. Each group solved the Desert Survival Situation (ELM, 1974) and the Subarctic Survival Situation (ELM, 1975). Groups were supervised by trained leaders who assumed the role of either an authoritative or participative supervisor. Upon completion of the experimental tasks, subjects responded to a research questionnaire designed to measure the following indices of group growth:

satisfaction with the group, cohesiveness, commitment, consensus of perception of group member competence, and perceived problem solving effectiveness.

Multivariate analysis of variance provided support for the hypothesis that groups led by participative leaders would have significantly higher levels of growth than groups led by authoritative leaders. Inspection of the univariate analyses of variance revealed that groups led by participative leaders were more satisfied, more cohesive, more committed and perceived themselves to be better problem solvers than groups led by authoritative leaders.

The results of this study tentatively suggest a sequential chain of development with attitudinal changes occurring in the earlier stages. These attitudinal changes lead to changes in the organizational climate which encourage and support reciprocal exploration of resources by group members. Increased organizational effectiveness is seen as the end-result of these changes. Limitations on the interpretation of findings and implications are discussed in the final chapter.

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Stuart Lee Ralsky

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Many individuals have been instrumental in the completion of this dissertation. This section serves to recognize the contribution of those who have most influenced this research.

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Dr. Vincent Farace was available for critical comment throughout this research. Patrick Eady, of Experiential Learning Methods, graciously provided the instruments used during the experimental sessions. Brian Coyle provided computer assistance which made the data analysis more manageable.

Finally, my wife, Barbara, gave me psychological support when my problems seemed insurmountable. Her smiling face often placed things in their proper perspective.

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CHAPTER I

REVIEW OF THE LITERATURE

Introduction

With the advent of the industrial revolution, organizations were faced with solving the problem of how to combine large numbers of individual inputs in the most efficient manner. The mechanism that was adopted to deal with this problem was the bureaucratic model. Today, many organizations continue to operate under the assumptions of traditional bureaucracy. Yet, there can be no doubt that the conditions faced by modern organizations are appreciably different from those under which bureaucracy emerged.

As noted by Bennis (1969), bureaucracy evolved from the organization's need for order and precision and its strength lies in its capacity to manage routine and predictable affairs. Contemporary organizations, however, are faced with staggering rates of change which have forced organizational scholars to question the efficacy of the bureaucratic model.

One of the major criticisms leveled at traditional organizational theory, over the past twenty-five years, has been its failure to effectively integrate organizational and individual needs in a manner that is mutually beneficial. Argyris (1957) points to the incongruency between the demands made by organizations and the needs of individuals. It is Argyris's contention that "the basic impact of

the formal organization is to make the employees feel dependent, submissive, and passive, and to require them to utilize only a few of their less important abilities" (p. 75).

Similar sentiments are expressed in McGregor's (1960) Theory X and Theory Y. McGregor argues that traditional organizational theory is based on the assumptions that man inherently dislikes work, needs to be coerced and threatened with punishment if organizational objectives are to be attained and prefers to be controlled rather than be given responsibility. Because of these assumptions concerning the nature of man, organizations typically adopt authoritative leadership to regulate the activities of organizational members. In response to the use of control as a guiding mechanism organizational members exhibit behaviors that are interpreted by management as support for their original assumptions. McGregor argues that this is a case of erroneously accepting the effects for the causes.

An alternative to the assumptions that management typically accepts is suggested by McGregor. According to Theory Y assumptions, man is capable of accepting responsibility, can commit himself to the attainment of organizational objectives, and has the ability to contribute creative solutions to organizational problems. Whether or not organizational members will exercise these potentials depends on the organization's ability to effectively link performance with the rewards desired by employees. The rewards referred to by McGregor include the satisfaction of ego and self-actualization needs which are perceived by management as threatening. Thus, according to McGregor, unless management is willing to utilize the principle of integrating the individual's need for growth with organizational goals, a vast amount

of potential energy will be lost. Among the implicit negative effects of the incompatibility of organizational and individual goals is the notion that employees, under traditional organizational conditions, will limit their commitment and motivation to attain organizational goals.

An alternative to the bureaucratic model is suggested by Likert (1961, 1967) who places managerial systems on a continuum ranging from exploitive authoritative (System I) to participative (System IV). Likert contends that an active system of participation throughout an organization will not only have the effect of increasing employee motivation and commitment but will also positively affect communication, decision-making, goal-setting and a number of performance characteristics.

Likert's organizational model is based on the notion that organizations possess an untapped reservoir of human resources that can be effectively utilized through a system of participation that links all organizational members. The organization is conceptualized as a system of overlapping work groups in which employees are encouraged to contribute the inputs they possess. By instilling in members a sense of "ownership" of organizational problems the work group is able to use its own ingenuity and resources to derive solutions. The participative system of management is seen as flexible enough to cope with change while tapping a wide range of human resources to bring about organizational effectiveness.

While the introduction of Likert's organizational model to existing literature has occurred relatively recently, research concerning the differential effects of authoritative and participative

leadership dates back to the late 1930's. Since that time a vast amount of research, conducted in both laboratory and field settings, has been produced. Extensive reviews of prior research are presented by a number of authors (Bucklow, 1966; Lowin, 1968; Vroom, 1964; and Stogdill, 1974). The ensuing discussion focuses on significant studies that have direct bearing on the current research.

The present investigation is concerned with the effects of leadership style on some aspects of group growth. The variables considered to represent group growth are productivity, satisfaction, cohesiveness, commitment, consensus of perception of group member competence, and perceived problem solving effectiveness. Sixteen groups, eight led by participative leaders and eight led by authoritative leaders are used to investigate the relationship between leadership style and group growth.

Leadership Style and Productivity

Interest in the effects of participative and authoritative leadership can be traced back to the classic study of Lewin, Lippitt, and White (1939). While the primary concern of this research was the patterns of aggressive behavior that emerged in differing social climates, and not productivity, the impact of this study on later research makes it fitting to discuss at this time.

The authors report the results of two experiments that focused on the responses of groups of 10-year old children when exposed to authoritative, democratic and laissez-faire leadership. Subjects worked on tasks including mask-making, mural painting, soap carving, and model airplane construction, among others. In order to create

the different group atmospheres, leaders adopted the following behaviors (p. 273):

Authoritarian - (1) All policy determined by the leader. (2) Techniques and activity steps dictated by the leader, one at a time, so that future steps were always uncertain. (3) Leader usually dictated the particular work task and work companions of each member. (4) Leader was personal in his praise and criticism of each member.

Democratic - (1) All policy determined by group discussions and decision, encouraged and assisted by leader. (2) Activity perspective gained during first discussion. General steps to group goal sketched. When technical assistance was needed the leader suggested alternatives from which the choice could be made. (3) Members were free to work with whomever they chose and the group could choose its task. (4) Leader was objective in his praise and criticism.

While a third social climate, laissez-faire, was established, it will be omitted from this discussion.

The first experiment compared one group of children under autocratic leadership and one group under democratic leadership. The results of this study indicated that club members exposed to authoritarian leadership developed a pattern of aggressive domination toward each other while their relation to the leader was one of submission or demand for attention. Overt hostility in the authoritative group occurred at a rate of 40 to 1 when compared to the democratic groups. Furthermore, 75 percent of the language behavior of the authoritative group, compared to 31 percent in democratic groups, fell into the categories of hostile, resistant, demands for attention, hostile criticism, and expression of competition. Sixty-nine percent of the democratic groups' language was categorized as objective while authoritative groups had only twenty-seven percent.

The second experiment reported by Lewin, Lippitt, and White reveals an interesting contrast to the findings mentioned above. Of the five autocratic groups in this study, four had extremely low levels of aggression while one had an extremely high level. When the two experiments are considered together, it appears that aggression under autocratic leadership assumes a bimodal distribution. The authors interpret the extremely low levels of aggression as a frustrated, apathetic response. In support of this conclusion, the authors report that when members of these groups were switched to either democratic or laissez-faire climates there was a sudden outburst of aggression. In addition, when the leaders of the "apathetic autocracies" left the room the level of aggression rose to ten times its former level. When other leaders left the room the level of aggression remained constant. A final line of evidence to support the notion of high levels of frustration in these groups comes from interviews conducted at the conclusion of the experiment, with the children themselves. Nineteen of the twenty boys interviewed indicated that they liked the democratic leader better than the autocratic leader.

It appears then that two types of responses to authoritative leadership are likely. One type of response involves high levels of aggression, an overt reaction to the frustration induced by autocratic leadership, while the other response involves an apathetic behavioral reaction along with an increased state of tension which finds an outlet when the frustrating agent (the leader) is removed from the field.

In addition to the aggressive reactions noted above, the authors also report the following results: (1) the feeling of togetherness was greater in democracy; (2) the group structure was more stable

and tended to maintain a higher degree of unity in the democratic group; (3) members of the autocratic group sometimes became scapegoats; and (4) the feeling for group property and group goals was much better developed in the democratic group.

Even though the Lewin, Lippitt and White study lacked a rigorous experimental design, the richness of their report suggested a number of potential hypotheses that could be researched in either organizational or laboratory settings.

One of the earlier studies (Coch and French, 1948) involved two experiments conducted at the main pajama producing plant of the Harwood Manufacturing Corporation. The company frequently changed the methods and jobs of the employees and, despite a transfer bonus that accompanied job changes, the production workers maintained markedly negative attitudes toward their job changes. This resistance was evidenced by grievances about the piece rates that went with the new methods, high turnover, low efficiency, restriction of output, and aggression toward management. The authors theorized that resistance to change was caused by an individual reaction to frustration in conjunction with group induced forces. Thus, it was felt that the use of group methods would be appropriate for overcoming resistance to change.

The first experiment afforded employees varying degrees of participation before job changes were made. The control group did not participate in the planning of the change while two experimental groups were allowed to participate through representatives and two other experimental groups experienced participation by all members. Care was taken to match the four experimental groups with respect to

efficiency ratings prior to the transfer, the degree of change involved in the transfer and the amount of cohesiveness observed in the groups.

The results of this experiment indicated that the rate of recovery in production was directly proportional to the amount of participation. The no participation group showed little improvement in their efficiency ratings over a period of thirty-two days.

Employees that were not allowed to participate in the planning of the change expressed aggressive behavior toward management, filed grievances about the new piece rate and experienced a 17% turnover rate over the course of the experiment.

In contrast, the two experimental groups that received representative participation had an unusually good relearning curve and had reached standard within fourteen days. Their attitude was characterized as cooperative and during the experimental period there was no turnover.

Finally, the experimental groups that were allowed total participation exhibited the fastest rate of recovery in efficiency ratings. There was no turnover in these groups during the experimental period and no indications of aggression were observed.

In order to further explore the efficacy of participation as a method of overcoming resistance to change, a second experiment was conducted. Two and a half months after the first experiment, members of the original no participation group were brought together and allowed total participation in the planning of job changes. The results of the second experiment were consistent with the previous findings. Efficiency ratings improved rapidly and there was neither aggression nor turnover during the nineteen days after the change.

While the second experiment is open to criticism because of the restricted range of employees remaining after the initial no participation exposure, the results of the Coch and French study provide support for the notion that participation in the planning of change yields higher levels of productive efficiency. The authors attribute the varying levels of productive efficiency attained to a combination of forces that operate to create a condition of quasi-stationary equilibrium. One of the major determinants of the point of productive equilibrium is the power of group standards. Coch and French conclude that the strength of the group standard depends heavily upon the existing degree of cohesiveness in the group which has the power to increase or decrease productivity. Whether or not the group standard operates to increase or decrease actual productivity appears to be a function of the extent to which the group is allowed to participate in the planning of change.

Utilizing survey research techniques Katz, Maccoby and Morse (1950) investigated the differences in the style of supervision of high and low producing work groups. The research was conducted at the home office of the Prudential Insurance Company and examined twelve pairs of high-low producing clerical sections. Interviews were conducted with seventy-three supervisory and 419 non-supervisory personnel.

The results revealed that supervisors of high producing sections reported spending fifty percent or more of their time performing the supervisory acts of overseeing and planning the work of the staff. Supervisors of low producing sections, conversely,

reported spending more than half of their time engaging in the same general work as the experienced employees of their sections.

The data also indicated that leaders of low producing sections supervised their employees more closely than did leaders of high producing sections. Supervisors of low producing sections were more likely than supervisory of high producing sections "to exert pressure on their employees for production, to handle extra work by asking the group to work harder or to work overtime, to permit less freedom of conduct for their employees, to discourage participation and to delegate no authority to employees" (p. 20). High producing section heads stressed the human relations aspects of their job while low producing section heads stressed the production and technical aspects of their job. These results suggest that supervisors of high producing sections utilize an "employee-centered" approach in contrast to the "production-centered" approach of supervisors of low producing sections.

Interviewer ratings of supervisors indicated that high producing section heads were more democratic, less authoritative, exercised better judgment and were more reasonable than heads of low producing sections. The system wide effects of supervisory style are also supported by the reports of high producing supervisors who indicated that they were supervised less closely by their superiors and that they were more satisfied with their amount of authority and responsibility than low producing supervisors.

The results of the Katz, Maccoby and Morse research lead one to conclude that supervisors of high producing groups tend to give general rather than close supervision, to be employee-centered rather

than production-centered and to have a democratic rather than authoritative orientation. The styles of supervision exhibited by high producing section heads seem to lend credence to the hypothesis that participation is associated with high levels of productivity.

Other research that support the findings of Katz et al. is provided by Comrey, Pfiffner, and Beem (1952) who examined patterns of supervisory behavior in eighteen United States Forests in California. Results revealed that supervisors in the highly rated forests were more democratic with top assistants, and were more sharing of information than supervisors in low rated forests. A program designed to determine the effectiveness of supervisory personnel in the Detroit Edison Company (Mann and Dent, 1954) found that leaders who were considered immediately promotable were seen as "leaders of men", "reasonable in expectations" and "likeable." In contrast, supervisors with low ratings were seen as "drivers," "bossy," and "quick to criticize." Specifically, highly rated supervisors were seen as discussing personal and work related problems, going to bat for subordinates and using general, not close, supervision. Kay and Meyer (1962) report similar results in a study of foremen at General Electric.

A laboratory experiment conducted by Day and Hamblin (1964) provides further supporting evidence concerning the positive effects of participation on productivity. Using a 2×2 factorial design, with closeness and punitiveness of supervision being manipulated, twenty-four groups consisting of four undergraduate women were given the task of assembling models of molecules. The manipulation was induced by supervisors, who were confederates of the experimenters.

The results revealed that groups exposed to close supervision produced twenty-five percent less ($p < .05$) than groups exposed to general supervision. Punitive leadership also resulted in decreased productivity. In addition, subject responses to a post-experimental questionnaire indicated that "close supervision produced a significant and large increment in aggressive feelings toward the supervisor... and a moderate and near-significant increment in aggressive feelings toward co-workers" (P. 507). The decreased productivity associated with close and punitive leadership is seen by the authors as indirect aggression brought on by the frustration of ego needs.

In a study of ninety work groups in seven British factories Argyle, Gardner, and Cioffi (1958) found that the extent to which foremen were non-punitive in their relationships with subordinates had a significant positive relationship to productivity.

Perhaps the most comprehensive examination of the effects of participation in a field setting is provided by Marrow, Bowers, and Seashore (1967). In 1962 the Harwood Manufacturing Corporation bought the Weldon Manufacturing Company and began an extensive program of change aimed at utilizing Likert's organizational model as a means of improving the performance of the acquisition. The change program lasted two years with performance measures gathered weekly. In order to assess the attitudinal effects of the change program anonymous periodic questionnaires were completed by random samples of non-supervisory employees in both plants. Pre-post comparisons to determine the effectiveness of the changes were made with the Harwood plant serving as a control group.

Numerous technical changes were made including restructuring of jobs, addition of new machinery and reorganization of the work flow. Social changes consisted of sensitivity training for first level and above supervisors, utilization of work group problem solving sessions, and an effort to push decision-making down to the lowest feasible levels of the organization, among others.

The results showed a marked improvement in the performance of the Weldon Company from 1962 to 1964. Among the most notable performance changes were a thirty-two percent increase in return on capital invested, an eight percent decrease in make-up pay, a twenty-five percent increase in production efficiency, a six percent decrease in turnover, and a three percent decrease in absenteeism. While it is impossible to determine the causative relationships involved in this productive increase, the results of this study impressively document the positive effects of participation.

While the studies cited thus far point to the positive effects of participation in terms of productivity, there are a number of reports that conflict with these findings. Berkowitz (1953) examined seventy-two conference groups from industrial, retailing, federal and local government with the goal of determining the effects of the sharing of leadership functions by group members. The groups ranged in size from five to seventeen members with a mean of nine.

Using the proportion of agenda items completed of those brought up for consideration as the measure of productivity, Berkowitz found no relationship between the leader control of the procedure and productivity.

In an explanation of parallel divisions of clerical workers Morse and Reimer (1956) investigated the effects of increasing the decision-making power of rank-and-file workers. Based upon the previous work of Lewin and Lippitt (1938) and Coch and French (1948), the authors hypothesized that an increased role in decision-making for rank-and-file groups would increase productivity and satisfaction. Their findings in terms of satisfaction are discussed in a later portion of this review. The following summarization of the experimental design is provided by the authors:

Using four parallel divisions of the clerical operations of an organization, two programs of change were introduced. One program, the Autonomy program involving two of the divisions, was designed to increase the role of rank-and-file employees in the decision-making processes of the organization. The other two divisions received a program designed to increase the role of upper management in the decision-making processes (the Hierarchically-controlled program) (p. 129).

The development of the experimental conditions followed three steps: (a) planning by research staff and company officials; (b) introducing the program to the division supervisory personnel and training of the supervisors in their new role; and (c) introduction to the clerks and operation under experimental conditions. The two main change processes used included formal structural changes to create a new organizational environment for the divisions and the training of supervisors to ensure that formal changes would result in actual changes in relations between people.

The results in terms of productivity revealed that both experimental groups had significant increases in productivity. The Hierarchically-controlled groups, however, had significantly greater improvement than the Autonomy groups. The productivity measure used

in this study was the actual clerical costs divided by the standard cost expected for that volume. Since the volume of work was not under the control of the division studied, the only way in which productivity could be increased was by decreasing the number of employees. In this situation the Hierarchically-controlled groups were clearly at an advantage. While the autonomy program reduced their numbers by leaving vacancies unfilled, the hierarchical program could simply cut their staff.

Furthermore, indirect costs such as turnover were not included in the performance measure. An indication of the increased costs of turnover in the hierarchically-controlled program is provided by the fact that of the twenty-three women making negative comments about the pressure and work standards during the exit interview, nineteen were from the hierarchical groups.

In summary, the results of the Morse and Reimer investigation do not support the superiority of participation. Yet, the long-term effects of the two programs are open to question. As pointed out by Likert (1961):

The results ... give every reason to believe that had the clerical experiment been continued for another year or two, productivity and quality of work would have continued to increase in the participative program, while in the hierarchically controlled program productivity and quality of work would have declined as a result of the hostility, resentment, and turnover evoked by the program (p. 69).

An example of survey research that has failed to support the superiority of participation is presented by Katz, Maccoby, Gurin and Floor (1951). The authors investigated maintenance crews from the C & O Railroad in an attempt to replicate the results they had found in an insurance company (Katz, Maccoby, and Morse, 1950).

Thirty-six work groups that were comparable in technical work conditions but differentiated in terms of performance were studied. The findings indicated that, as in the insurance company, leaders of high producing groups were more "employee-centered" and "better able to differentiate their role as leader." There was, however, no difference between leaders of high and low producing groups in terms of the closeness of supervision.

The failure to replicate the earlier findings is explained by the authors as due to the different technologies involved. The standardized work methods at the insurance company make close supervision a threat and an annoyance to the workers. The railroad section groups experience less routinization and are small enough to allow individuals to benefit from the superior technical knowledge of their foremen. The authors conclude that:

There is no positive relationship between productivity and close supervision in the railroad study and it is likely that the foreman's technical contribution is not sufficient to outweigh possible detrimental effects of close supervision on worker motivation (p. 34).

There are a number of laboratory investigations that fail to demonstrate the superiority of participative leadership over authoritative leadership in terms of productivity. Katzell, Miller, Rotter, and Venet (1970) studied seventy-six groups, comprised of two undergraduates and one confederate of the experimenter. The confederate played the role of either a directive leader (gave suggestions, opinions, and information) or a non-directive leader (asked for suggestions, opinions, and information). The task used in this study was a modified version of the "Twenty Questions Game."

An analysis of variance revealed that the mean amount of time required to complete the task was significantly less ($p < .01$) under directive leadership. The number of questions needed to solve the problem was also significantly less ($p < .05$) in directive groups.

Using a laboratory simulation of a radar air traffic control center Kidd and Christy (1961) examined the effects of three types of supervisory roles. Laissez-faire leaders acted as passive monitors of the on-going operation, active monitors (directive leaders) acted as "super-controllers" and direct participants (participative leaders) intervened only when difficulty arose. Productivity was measured by: (1) mean percent delay-rapidity with which the aircraft moved through the system; (2) pilot error detection lag - the amount of time required to catch preprogrammed errors; (3) number of controller errors made in positioning aircraft for final position of landing process; and (4) controller errors involving aircraft separation.

The results indicated that laissez-faire leaders were superior according to the delay criterion while directive leaders excelled in detecting preprogrammed errors and avoiding positioning errors. Participative leaders were superior only in avoiding separation errors.

McCurdy and Lambert (1952) and McCurdy and Eber (1953) found no differences in the productivity of three-man problem-solving groups led by authoritative and democratic leaders. Johnson and Smith (1953) found no difference in the academic achievements of two classrooms taught by democratic methods and two classrooms taught by *lecture-discussion* methods. Dawson, Messé, and Phillips (1972) reported that higher levels of consideration and initiation of structure

resulted in higher levels of student performance with the effect of initiation of structure being somewhat weaker than consideration. Mullen (1965) looked at three managers utilizing different supervisory styles over a period of three years. No differences concerning productivity were found between the permissive (participative), recessive (laissez-faire), and authoritarian leaders. Finally, Adams (1952) found a correlation of .40 between authoritarian atmosphere and performance in his study of Air Force bomber crews.

When the literature concerning the differential effects of participative and authoritative leadership on productivity is considered in its entirety, it is difficult to conclude that either style of supervision is associated with higher efficiency. As pointed out by Anderson (1963): "The evidence available fails to demonstrate either authoritarian or democratic leadership is consistently associated with higher productivity" (p. 160).

Leadership Style and Satisfaction

While there are inconclusive findings concerning the effects of leadership style and productivity, the evidence is more clear cut when leadership style and satisfaction is considered. Baumgartel (1957) examined the relationship of leadership style to the motivations and attitudes of subordinates in research institutes. Twenty research laboratories, ranging in size from six to thirty-four members with a mean of 16.5, were examined and categorized according to the leadership behavior of second level research administrators. Of the twenty laboratory leaders six were laissez-faire, seven were participative and five were directive. Two of the leaders were

considered inconsistent in their behavior and were dropped from the analysis.

Baumgartel predicted that participative leadership would be associated with higher levels of motivation toward organizational goals, a higher sense of progress toward those goals and more favorable attitudes toward the leader. The rationale presented for these predictions was "where a subordinate shares in the decision process, he can become more committed to decisions and can more fully internalize the goals of the organization of which he is a part" (p. 352).

The dependent measures utilized included research orientation, sense of progress, attitudes toward the director and overall satisfaction. Of the fourteen comparisons made between participative and directive laboratories thirteen were in the predicted direction. The greatest differences between directive and participative laboratories were found in sense of progress and overall satisfaction. On both of these indices of attitudes the participative labs were found to be significantly ($p < .05$) higher than directive labs. The author concludes that shared leadership is a realistic way to achieve more effective performance and to increase personal satisfaction.

In the Morse and Reimer (1956) study of clerical workers, referred to earlier, satisfaction in the Autonomy and Hierarchical programs was also investigated. The authors hypothesized that an increased role in decision-making would provide different and more need-satisfying decisions and would, therefore, lead to greater satisfaction in the Autonomy program. The authors investigated five different types of satisfaction: (1) self-actualization and growth; (2) satisfaction with supervisors; (3) liking for working for the

company; (4) job satisfaction; and (5) liking for the program.

Using changes from pre and post experimental questionnaires the results revealed that the two groups exposed to the Hierarchical program had a significant ($p < .05$) decrease in perceived self-actualization while the groups exposed to the Autonomy program experienced a significant ($p < .05$) increase in perceived self-actualization. Two indices, satisfaction with relations with supervisors and satisfaction with supervisors as a representative, were used to measure satisfaction with supervision. The results indicate that, "in general there is a shift toward greater satisfaction with supervisors in the Autonomy program and toward less satisfaction with supervisors in the Hierarchically-controlled program" (p. 124).

Satisfaction with the company was assessed by one general question, "Taking things as a whole, how do you like working for _____ (the name of the company)?" (p. 125). As predicted, groups in the Autonomy program had significant ($p < .05$) increases in satisfaction with the company while groups in the Hierarchically-controlled program had significant ($p < .01$) decreases.

The effect of the change program on satisfaction with the job was in the predicted direction. Autonomy groups experienced a slight, non-significant, increase in job satisfaction while Hierarchical groups had a significant ($p < .05$) decrease in job satisfaction. The authors contend that the Autonomy groups' non-significant increase in job satisfaction may be attributable to increased expectations.

Open-ended questions at the conclusion of the experiment also support the prediction of higher satisfaction in the Autonomy groups. Clerks in the Autonomy program typically wanted the program to last

and disliked the other program while clerks in the Hierarchical program wanted the program to end immediately and liked the other program better.

These results, taken as a whole, tend to verify the hypothesis that an increased role in decision making is accompanied by increased satisfaction. All of the results were in the predicted direction with the bulk of them being statistically significant.

Using the survey research technique in a large metropolitan insurance company, Morse (1953) examined the effects of close and general supervision in terms of satisfaction. Her findings demonstrated that workers subjected to a close supervision style were less satisfied with the supervisor's ability to handle people. Close supervision also led to less satisfaction with the reasonableness of supervisory expectations and less satisfaction with rules enforced by the supervisor.

A number of laboratory investigations have also examined the participation-satisfaction hypothesis. Reporting on two different experiments, Shaw (1959), using analysis of variance, found in the first experiment that followers in a decentralized network were significantly ($p < .001$) more satisfied than followers in a centralized structure. The second experiment placed subjects in a power structure (one person made all the decisions) or a no-power structure (all subjects had an equal voice in the decision). The results showed subjects in the no-power structure were significantly ($p < .02$) more satisfied than subjects in the power-differentiated structure.

In a study referred to earlier Katzell et al. (1970) also investigated the effects of directive and non-directive leadership on satisfaction. The analysis of variance indicated that subjects with directive leaders were significantly ($p < .05$) less satisfied than subjects with non-directive leaders.

Other studies that tend to confirm the participation-satisfaction hypothesis include Fox (1957) who found that members were more satisfied with the performance of participative conference leaders than directive conference leaders. Ziller (1957) found that problem-solving groups were least satisfied with authoritative leaders while Mullen (1965) showed that non-supervisory personnel were most satisfied with permissive leadership and least satisfied with authoritative leadership. Weschler, Kahane, and Tannenbaum (1952) and Gibb (1951) also present evidence to support the association between participation and satisfaction.

While there is ample evidence to conclude that participation has a positive effect on satisfaction there are a number of studies that fail to clearly demonstrate this relationship. In a study of a Norwegian factory French, Israel and As (1960) attempted to manipulate the amount of participation in four-man groups. Four groups served as controls while two groups were allowed "moderate participation" and three groups received "weak participation."

The experimental groups reported greater satisfaction on ten of fourteen items but only three of these were statistically significant. There is reason to believe, however, that the experimental manipulation was not very strong.

When asked about the degree to which the subjects felt they had an influence on the choice of the article produced there was a non-significant difference between the experimental and control groups. No difference between the groups was reported when they were asked about their influence in terms of the length of their training. There was, apparently, a lack of trust of management among the workers as they expressed a fear of piece-rates being cut if productivity attained high levels.

Perhaps the most telling criticism of this study lies in the relevance of the decisions the workers were allowed to participate in. As pointed out by the authors:

The most relevant decisions, namely those about piece-rates and about the level of production, were participated in equally by the experimental and control groups (p. 13).

It would seem that while satisfaction did increase in the experimental groups the amount of the increase may have been tempered by the low amount of participation allowed.

In a field experiment conducted in an aircraft engine manufacturing plant Kay, French, and Meyer (1962) varied the amount of participation salaried employees were allowed in goal-planning sessions. At the conclusion of an appraisal interview with their supervisors subjects were told to prepare a set of goals to be reviewed at a goal-planning session. The supervisors of one-half of the subjects were instructed to allow their subordinates more influence than themselves in the final formulation of goals. Supervisors of the other half of the subjects were instructed to allow subordinates much less participation in the final formulation of

goals. Few differences were noted in the attitudes of both high and low participation subjects in interviews conducted at the conclusion of the experiment. Subjects in the high participation condition did report significantly greater acceptance of job goals than subjects in the low participation condition.

A study of conference leadership by Berkowitz (1953) found that satisfaction with the conference had a positive, significant ($p < .05$), correlation of .29 with leader control of the procedure. This relationship, however, was found to hold only when the group's problems were not too urgent. When problems faced by the group were urgent a correlation of .12 was found between satisfaction and leader permissiveness. A negative correlation of $-.04$ was found between control of the process and satisfaction when problems were urgent.

The results of the Berkowitz study seem to bear more on the violation of member expectations than on the effects of participative and authoritative leadership. Since the leaders of the conference groups were clearly of a higher status level than group members it is reasonable to assume that group members desired the maintenance of hierarchical structure. The finding of a positive relationship between leader control and satisfaction supports this assumption. Yet, when problems were urgent group members were more satisfied with permissive leaders. As stated by the author, "The group's motivation to reach a problem solution as quickly as possible thus appears to be stronger than its motivation to conform to the expectancies concerning role differentiation" (p. 237). The results of this study, then, may indicate that satisfaction goes down when member expectations are violated, rather than when leader control decreases.

In a laboratory study of sixty male undergraduates Rosenbaum and Rosenbaum (1971) examined the effects of authoritative and participative leadership on satisfaction. Twenty experimental groups consisting of three naive subjects and a confederate of the experimenter performed structured and unstructured tasks. Analysis of variance revealed that there was no difference in satisfaction under the different leadership styles. Other studies that find either no difference between authoritatively and participatively led groups, or greater satisfaction in authoritatively led groups, include Pheyssey and Payne (1970) and Levy (1954).

While there are a number of reports available that fail to demonstrate a positive relationship between participation and satisfaction, the bulk of the evidence seems to support the participation-satisfaction hypothesis. Of ten studies reviewed by Stogdill (1974) eight verify this hypothesis (p. 391). Vroom (1964) is led to the conclusion that:

There is fairly clear-cut evidence that people who are satisfied with their jobs tend to report that they have greater opportunity to influence decisions which have effects on them (p. 118).

Leadership Style: Cohesiveness and Commitment

While there has been extensive research aimed at determining the effectiveness of leadership style in terms of productivity and satisfaction, the same cannot be said of cohesiveness and commitment. Very few studies have concerned themselves with uncovering any direct relationship between style of supervision and its effect on cohesiveness and commitment. Because of the paucity of relevant research most of the evidence cited in this section is of an indirect nature.

Lewin and Lippitt (1938), in their analysis of groups of children exposed to different leadership, found that democratic groups had stronger feelings of togetherness along with better developed feelings for group property and group goals than autocratic groups. This early finding suggests that participation may lead to higher levels of cohesiveness and commitment.

In a study of group centered and leader centered supervisory style Bovard (1951) examined the effects of these leadership styles on interpersonal affect in face-to-face groups. Verbal interaction was encouraged in the group centered condition and limited in the leader centered condition. The results indicated that members of the group centered process rated each other higher on an affect scale than did members of the leader centered process.

The results of both the Coch and French (1948) and Morse and Reimer (1956) studies showed that the amount of turnover in participative groups was less than in authoritative groups. This finding is further supported by Wickert (1951) who compared the questionnaire responses of telephone employees who had left the company with those of employees still on the job. The major distinguishing characteristic between these two groups was that employees still on the job reported greater opportunity to make decisions. Wickert's study is weakened, however, by the fact that questionnaires were filled out by those who had left the company after they had resigned and may, therefore, have been biased.

Ross and Zander (1957) were able to replicate the Wickert finding without the contaminating factor noted above. Of 2,680

female employees who filled out questionnaires, 169 resigned during the four month period following gathering of data. Each resigned employee was matched with two remaining employees on a number of demographic variables. Ross and Zander found that workers who had resigned reported lower amounts of autonomy and recognition.

Ley (1966) looked at turnover in a sample of 100 employees in a General Electric factory. Subjects who had quit within one year of employment were included in the study. The results showed a correlation of .76 between turnover and the authoritarianism of the supervisor. Fleishman, Harris, and Burt (1955) found correlations of -.49 and -.38 between the consideration of supervisors (measured by the Leadership Behavior Description Questionnaire) and the subordinates' absenteeism in studies of seventy-two production and twenty-three nonproduction foremen. In a study of a motor truck manufacturing plant Fleishman and Harris (1962) found relationships between the levels of absenteeism and grievances and supervisory scores on initiation of structure and consideration. High grievances and turnover were found to be related to low consideration and high initiation of structure.

In their study of close and punitive styles of leadership Day and Hamblin (1964) found that close supervision produced "a moderate and near significant increment in aggressive feelings toward co-workers" (p. 507). Seashore, Georgopoulos, and Tannenbaum (1955, reported in Likert, 1961) found that group loyalty was positively correlated with freedom of upward, downward, and lateral communication. Katz et al. (1950) found that pride in the work group, defined as the

degree of feeling of attachment to and satisfaction with the accomplishment of the immediate or secondary work group of which the employee is a member, was greater in high producing sections than in low producing sections.

The results of these studies provide tangential evidence that participation is positively related to cohesiveness and commitment. A more direct test is provided by Anderson (1974) who postulated that opportunity to participate was one of a number of determinants of group cohesion. In a laboratory setting Anderson hypothesized that groups experiencing high participation opportunity would be significantly more cohesive than groups experiencing low participation opportunity. The results of the analysis of variance revealed a significant main effect ($p < .01$) with high participation opportunity groups having higher levels of cohesion. The author concludes that "participation opportunity may be considered as a primary antecedent of cohesion" (p. 2).

In a study of two school districts in Western New York State, Alutto and Belasco (1972) investigated the effects of decisional deprivation (actual participation in fewer decisions than desired), decisional equilibrium (actual participation in as many decisions as desired), and decisional saturation (actual participation in a greater number of decisions than desired). An index of commitment was constructed on the basis of subject responses to whether or not they would leave their current school system for other employment if such inducement as increased pay, increased status, or friendlier colleagues were offered. The results indicated that while decisionally deprived subjects were somewhat less committed than other

subjects, the difference was not statistically significant. Decisionally deprived subjects were, however, significantly more favorable toward collective bargaining, strikes and unions.

While the studies discussed this far seem to provide tangential support for a positive relationship between participation and cohesion and commitment, there is research that fails to support this position. In a study of conference leadership, Berkowitz (1953) used the sum of five interrelated observer ratings of the attractiveness of the group situation as an index of cohesiveness. When this index was related to leader control of the process, a non-significant correlation of .04 was obtained.

A further analysis subdivided the seventy-two groups into three categories: those groups having no consistent leadership sharers; those groups having leadership sharers who appeared to be in a positive, supporting relationship with the chairman; and those groups having leadership sharers who were in a less supporting relationship with the chairman. The correlations between leader control of the process and cohesiveness in these groups were .02, -.10, and .31 respectively. These results indicate that as leadership sharing increases cohesiveness decreases. It appears, however, that groups which are in a non-supporting relationship with their chairman may unite together in opposition to their leader.

On the basis of these results, Berkowitz concludes that leadership sharing by members other than the designated leader tends to be related to a decrease in cohesiveness. This interpretation applies only to groups having supportive relationships with their

chairman. As discussed earlier, however, violation of member expectations may account for this relationship.

A similar finding is reported by Burke (1966) who studied directive and non-directive leadership with twenty-three groups of college students. While the groups led by non-directive leaders exhibited lower levels of cohesiveness, it is likely that violation of expectations may account for this result. In the discussion of the results Burke noted that antagonism, tension and absenteeism were in part caused by the failure of the leader (non-directive) to meet the demands of feedback by group members.

In their examination of seventy-six groups of college students Katzell et al. (1970) investigated the effects of directive and non-directive leadership on group process in terms of Bales's (1950) Interaction Process Analysis. Among the categories of Bales's IPA is group solidarity. The analysis of variance results revealed a significantly ($p < .05$) higher level of group solidarity in groups led by directive leaders.

Another report that fails to support the notion of increased cohesion resulting from participation is provided in a computer simulation by Kaczka and Kirk (1967). The results of this simulation indicate that while an employee-oriented leadership style is associated with high levels of profit, group pressure and cohesion are significantly lower than in a production-oriented managerial climate.

In general, then, it appears that previous research bearing on the relationship between leadership style and cohesiveness and commitment is tangential, at best. While there are positive findings relating participation to such variables as interpersonal affect,

group loyalty, pride in the work group and turnover, very little empirical data, that directly assesses a possible relationship between these variables, is available.

Leadership Style and Situational Variables

A number of authors have shown that the effects of participation are mediated by the personality characteristics of both the supervisor and the subordinate. While McGregor (1944) suggests that a subordinate's growth and development centers around his opportunity to participate, he acknowledges the individual differences in the need for independence.

There are vast individual differences in tolerance for the inevitable pressures and insecurities attendant upon the acceptance of responsibility. Some subordinates seem to be content to achieve a high degree of security without independence. Others thrive on the risks and dangers of being "on their own" (p. 152).

Vroom and Mann (1960) examined the personality characteristics of supervisors, in two groups within the same industrial organization, and their relationship to the attitudes of subordinates. The authoritarianism of supervisors was measured by the F scale (Adorno et al., 1950) and then correlated with subordinate attitudes. The obtained correlation was $-.41$ for twenty-four groups and $+.41$ for twenty-eight other groups. Those subordinates who had more favorable attitudes toward equalitarian leaders were characterized as working in small, highly interdependent work groups in which there was a great deal of interaction between the supervisor and his subordinates. On the other hand, subordinates who reported favorable attitudes toward authoritarian leaders were characterized as working in large groups

in which opportunity for interaction between the supervisor and his subordinates was restricted.

Shaw (1959) found a structure by leader interaction in his laboratory study. The results of this research show that groups led by low scorers on an acceptance of authority scale performed better than groups led by high scorers when the group structure was decentralized. The opposite was true when a centralized structure was used. In addition, followers that were high on authority acceptance were significantly ($p < .05$) more satisfied with the decentralized structure than followers that were low on authority acceptance.

Trow (1957) found that subjects in positions of high autonomy were more satisfied than subjects in more dependent positions. The autonomy-satisfaction relationship was, however, mediated by the subjects' need for autonomy.

The role of personality variables in determining the reaction of the subjects in each of the two groups in the Morse and Reimer (1956) study was examined by Tannenbaum and Allport (1956). Measures of the strength of personality trends were obtained for all individuals. Tannenbaum and Allport then classified individuals on the basis of the estimated suitability of their personalities to each experimental program. The results indicated that individuals that were suited to the program in which they were actually placed were more satisfied and wanted their program to last longer than those who were placed in programs that were incompatible with their personalities.

Vroom (1960) investigated the hypothesis that the stronger an individual's need for independence, the greater the extent to

which participation in decision-making in his job will result in his developing a more positive attitude toward that job. The opposite was predicted for authoritarian individuals. The same hypothesis was also tested for job performance. A correlation of .55 between attitudes toward the job and high need for independence was found while the correlation was only .03 between job attitudes and high authoritarianism. The correlation between supervisory ratings on a summary appraisal and high need for independence was .42 in contrast to the obtained correlation of .14 between the appraisal and high authoritarianism. It should also be noted that there was no evidence of any unfavorable effects of participation on either satisfaction or performance. Vroom concludes that "the evidence suggests that authoritarianism and need for independence interact with participation in determining attitudes toward the job and motivation for performance" (p. 71).

In addition to personality characteristics of supervisors and subordinates, the size and structure of an organization have mediating effects on participation. Indik (1965) investigated the hypothesis that the size of an organization influences member participation indirectly through its effects on specific organizational processes such as those relating to communication, control, task specialization and coordination. These processes effect the degree of attraction among organizational members, the amount of intrinsic job satisfaction and the degree of bureaucratic inflexibility felt by members which, in turn, directly affect the participation rates.

In order to examine this hypothesis Indik sampled thirty-two package delivery organizations, thirty-six automobile sales dealerships and twenty-eight voluntary organizations. The results revealed a correlation of $-.53$ between size and participation in the package delivery organizations. When communication and interpersonal attraction were partialled out the correlation dropped to $-.41$. In the automobile sales dealership the initial correlation of $-.34$ dropped to $-.20$ after partialling and in the voluntary organizations the correlation went from $-.42$ to $-.33$.

The author explains these results by pointing to the large number of potential and necessary communication linkages in larger organizations. Under these conditions communication is less adequate and leads to a decrease in interpersonal attraction which ultimately leads to decreased participation. Indik concludes that large organizations can have high rates of participation if they take steps to insure high rates of internal communication.

In evaluating the effectiveness of participation and worker autonomy Dubin (1965) distinguishes between unit or batch technology and continuous processing. He argues that worker autonomy may be relevant to unit-production technologies but probably not to mass-production technologies and certainly not to continuous-processing technologies. Thus, it seems that other characteristics that mediate the effectiveness of participation may be technology and structure.

A normative model that considers characteristics of the organizational and task environment has been developed by Vroom and Yetton (1973). The model is based upon the extent to which the leader involves his subordinates in the decision-making process and

ranges from no subordinate involvement to full collaboration in decision-making. By combining the attributes of the problem with the criteria for effective decision-making the authors generate a flowchart indicating which style of leadership will lead to effective outcomes.

The situational variables discussed in this section serve to mediate the effectiveness of participative leadership. The scope of the present study does not, however, afford an opportunity to examine these variables further.

Summary of Leadership Style Research

Researchers have investigated a variety of outcomes and situational determinants associated with participative leadership. The primary emphasis of these studies has been on the differential effects of authoritative and participative supervision on productivity and satisfaction. Results in terms of productivity have been conflicting while those relating to satisfaction have generally supported the superiority of the participative approach. The ambiguous findings in terms of productivity are interpretable, however, when tied to the underlying assumptions of the participative model.

In articulating his model for System IV management, Likert (1967) specifies three basic concepts that affect performance. The first of these is the principle of supportive relationships which follows:

The leadership and other processes of the organization must be such as to ensure a maximum probability that in all interactions and in all relationships within the organization, each member, in light of his background,

values, desires, and expectations, will view the experience as supportive and one which builds and maintains his sense of personal worth and importance (p. 47).

The principle of supportive relationships, in essence, states that the relationship between the superior and subordinate should be one which is supportive and ego-building.

The second basic concept set forth by Likert is the use of group decision-making by the supervisor. In contrast to traditional organizational structures that utilize man-to-man interactions, the participative model "uses an overlapping group form of structure with each work group linked to the rest of the organization by means of persons who are members of more than one group" (p. 50). In each work group (defined as a superior and all subordinates who report to him) all members who are affected by the outcome of a decision are involved in it. The work group approach to problem solving fosters a cooperative spirit in which members readily share information and skills. The whole organization works as an integrated system through the use of "linking-pins", which are those individuals that serve as a supervisor in one group and as a subordinate in another. This allows for the inputs of all groups in problem solving.

The third fundamental concept concerns high performance aspirations. Each employee is assumed to possess needs for pride in the job and company, job security, adequate pay and opportunities for promotion. These needs can be utilized to instill high performance aspirations in organizational members. Rather than imposing high performance goals on employees, group decision-making and multiple overlapping group structure serve as a mechanism through which

employees can help set the high performance aspirations which, when the goals are reached, lead to the satisfaction of their own need requirements. This, according to Likert, leads to an optimal integration of organizational and individual needs and desires.

With these three fundamental concepts in place, Likert defines three broad classes of variables to be considered in organizational effectiveness. The first of these are "causal" variables which are independent variables that determine the course of developments within an organization and the results achieved by the organization. Only independent variables that can be altered or modified by the organization and its management are used as causal variables. Thus, while economic conditions certainly affect the success of an organization, they are outside the control of the organization and, therefore, cannot be included as causal. Variables which are considered as causal include the structure of the organization, management's policies, decisions, business and leadership strategies, skills, and behavior.

The second broad class of variables are the "intervening" variables which reflect the internal state and health of the organization. Likert defines "the loyalties, attitudes, motivations, performance goals, and perceptions of all members and their collective capacity for effective interaction, communication, and decision making" (p. 29) as intervening variables.

The third, and final, set of variables are the dependent variables which represent the achievements of the organization. These variables are the "end-result" variables and include productivity, costs, scrap loss and earnings.

The participative model views productivity as one of a number of outcomes which can be traced to an organization's system of management. Management cannot, however, directly affect productivity. The impact of the management system on productivity is realized through the broad set of interrelated intervening variables. Participative leadership does not lead to instantaneous increases in productivity but instead requires time for changes in the intervening processes to occur which, theoretically, lead to higher levels of end-result variable attainment. As noted by Likert, "the great impact of this variable (time) has largely been ignored by both operating managers and social scientists..." (p. 77).

It would seem, then, that the failure of a number of studies to find an association between participation and productivity may be attributable to insufficient time for the required intervening processes to occur. Both laboratory and short-term field investigations that examine the relationship between participation and productivity are vulnerable to drawing conclusions without having taken into account the intervening processes prescribed by the model.

The advantage of the participative model over traditional organizational models is proposed to lie in its more positive influence on the intervening, attitudinal, perceptual variables. In theory, through the fundamental characteristics of the participative model, positive attitudes toward the organization are fostered. These attitudes and perceptions lead over time to an organizational environment in which exploration of resources that exist within the work group is encouraged and supported. By exploring the resources that are available in the group greater organizational efficiency is

attained. This position is based on the notion that the complex set of intervening variables develop more rapidly in organizations utilizing the participative model.

This intervening process can be conceived of as the growth of the group. As the group becomes more efficient in managing its resources it becomes more "mature". In their search for differential effects of leadership style on end-result variables, however, researchers have tended to either ignore the growth process or implicitly assume that participative supervision leads to more rapid attainment of growth and higher performance than authoritative supervision. While the previously cited research on participation and its relationship to satisfaction, cohesion and commitment is suggestive of a positive relationship between participation and growth, there is very little in the way of direct empirical investigation of this relationship.

Group Development

A number of authors have described the development of groups in a variety of settings. These have included therapy groups (Bion, 1948), sensitivity groups (Thelen and Dickerman, 1949; and Bennis and Sheppard, 1956), and task groups (Bales and Strodtbeck, 1951; Philp and Dunphy, 1959; and Bales, 1970). An extensive review of the group development literature is provided by Tuckman (1965).

The three different kinds of groups reviewed by Tuckman are (1) therapy groups; (2) sensitivity groups; and (3) laboratory problem-solving groups. The author proposes a four-stage model of group development that is equally applicable to all types of groups. These

stages are:

- (1) Testing and dependence. Testing refers to the establishment of acceptable interpersonal behaviors. Dependence refers to the fact that group members are often dependent upon a leader or other person for guidance in a new unstructured situation.
- (2) Intragroup conflict. This stage is characterized by emotional responses of group members which resist the formation of a group structure.
- (3) Development of group cohesion. Group members learn to accept one another and alternate interpretation of information is discussed openly.
- (4) Functional role-relatedness. The group is an effective problem-solving unit.

This model, however, is based primarily upon research dealing with therapy and sensitivity groups. While it is designed to account for development in all groups, the author acknowledges that the poorest fit of his model is with task groups. Thus, it appears that most group development literature describes the growth process in settings that are not appropriate for extrapolation to organizational work groups.

Heinen (1971) examined the development of work teams in a medium sized Scanlon Plan company. Group maturity was defined by the variables of cohesiveness, ability to solve problems, and shared norms. Four group process variables; identification, task development, communication, and leadership distribution, were hypothesized to contribute to the group's maturity. It was expected that as a group became more mature different processes would become more critical.

The results of Heinen's study failed to confirm any of the hypotheses. Since all work teams in the sample were from the same company, it is possible that the failure to find an association

between level of group maturity and importance of the various process variables may be attributable to a restricted sample. The author also raises the possibility that the groups may have represented a relatively primitive level of development.

Perhaps the most relevant discussion of group growth in an organizational setting is presented by Jacobson (1956) who examined the relationship between the activity level of committees and a set of potential determinants of committee functioning in a voluntary agency. A stratified sample of one hundred seven-man committees was selected to represent different levels of intensity of activity. Accordingly, twenty-five committees that were very active, medium active, low active, and inactive were included in the study. Data were gathered through the use of extensive personal interviews with the chairman and sub-chairman and all members of each of the 100 committees. A wide range of questions were asked in these interviews and provided a rich body of information from which a tentative, sequential chain of group development was derived. This was based on the assumption that degree of development could be equated with level of committee activity.

By examining the variables that distinguished the groups at different activity levels Jacobson described the following six stages in the development of voluntary groups:

(a) The first stage involves an identification of the individual with the group. The strength of this identification is assessed on the basis of the congruency between the individual's and the group's needs.

(b) The second stage concerns the extent of the opportunity for members to take part in group activities.

(c) The third stage is characterized by the development of a well-understood role structure. During this stage group members learn and practice the prescribed roles.

(d) The fourth stage involves an improvement in the communications among the groups which allows for a greater level of shared information.

(e) The fifth stage is the point at which leadership practices have its greatest influence on group behavior.

(f) The sixth, and final, stage is characterized by an existence of relatively enduring group processes which include operating group goals, group reward and sanction systems and group identification.

While Jacobson's description of group growth was developed on a post hoc basis in a voluntary agency, the basic processes he outlines could, conceptually, fit into the participative paradigm. The group, in its final stage of development, is one which allows members to participate in activities within a well defined role structure, and that provides communication opportunities among members and operates within the constraints of group norms.

The participative system of management, in theory, develops groups that contribute to the solution of organizational problems. They do this through the use of an overlapping group structure which allows members the opportunity to participate and communicate freely within their groups. These groups are essentially the same as the "mature" groups described by Jacobson. Empirical research bearing on the relative effects of supervisory style on the development of such groups is lacking.

Scope of the Present Study

The participative model proposes that groups that are allowed to contribute to solutions will attain higher levels of efficiency

through the development of intervening processes than realized through traditional leadership. Previous research examining the differential effects of authoritative and participative leadership on the intervening variables that link a managerial system and organizational outcomes has tended to be fragmentary in nature. The research that most closely reproduces the intervening processes prescribed by the participative model has focused on the effects of supervisory style on variables such as turnover and group loyalty and must, therefore, be considered tangential, indirect examination of the problem. Furthermore, these studies have usually investigated a limited number of intervening variables and have failed to examine these variables in the interactive manner in which they operate.

The primary purpose of this study is to examine the relationship between supervisory style and a number of indices of group growth. This study does not examine any differences that might exist in the process of group growth under authoritative and participative leadership (as might be involved in a Bales type of analysis), but instead addresses itself to the general question of whether or not these leadership styles are differentially related to outcomes considered to represent some dimensions of group growth. Due to the paucity of research related to this question, the present research must be considered exploratory in nature.

The present research was conducted in a laboratory setting and is recognized as an investigation of artificially formed groups. Generalizability of any findings concerning indices of the growth of these artificial groups to ongoing work groups with historical relationships within an organizational context is limited. Furthermore,

the limited time span of this experiment provides information pertaining only to the initial stages of group growth. It is felt, however, that any differences in the levels of group growth that occur within the constraints noted above can serve as a starting point for future research.

CHAPTER II

METHODOLOGY AND EXPERIMENTAL DESIGN

Independent Variables

The independent variables in this study are two differing styles of leadership, authoritative and participative. While previous research has frequently used these differing styles of leadership as independent variables there has been a lack of specific definitions of behavioral differences between authoritative and participative leaders.

For the purposes of this study authoritative leaders are conceptualized as exerting their influence in the group freely and exercising strong control over the group process. Responsibility for the group product lies with the authoritative leader and, as such, places the ownership of the group problem within the leader. Because of this locus of ownership, the authoritative leader responds to questions from the group by receiving them and then unilaterally deciding upon their resolution rather than reflecting them back to the group. This type of problem solving process creates an atmosphere in which group members make contributions on the basis of implicit or explicit cues from the leader rather than on a spontaneous basis. Furthermore, authoritative leaders monitor task accomplishment on a close, frequent basis and evaluate group member contributions in terms

of their own preconceived solutions. It is important to note, however, that authoritative leaders are not conceived of as punitive.

Participative leaders are conceptualized as encouraging the group to control its own process. Responsibility for the group product lies within the group and, as such, places the ownership of the group problem within the group. Since the locus of problem ownership is placed in the group the leader responds to questions from the group by reflecting them back to the group for resolution by consensus. This type of problem solving process creates an atmosphere in which group members are most likely to make contributions on a spontaneous basis. Participative leaders monitor group process in a general manner and leave evaluation to the group as a whole. While it is important to recognize that authoritative leaders are not conceived of as punitive, it is equally important to note that participative leaders are not completely permissive and seen as abdicating their role, but rather as aiding the group to use its potential in reaching problem solution.

Leadership Training

Seven advanced undergraduate students were trained to assume the roles of both authoritative and participative leaders. Training sessions were held for six hours each week and lasted for a period of six weeks. The training sessions were organized in the sequence that follows:

- (1) During the first session the leaders and the experimenter discussed the general theoretical constructs of participative and authoritative leadership. This introductory session ended in agreement that the conceptual definitions found above were appropriate.

(2) During the second training session leaders were exposed to the experimental tasks (see Appendix A) to be used in this study. After answering questions concerning the tasks the leaders and experimenter jointly produced introductory scripts to be used during experimental sessions. These scripts were developed to induce a set within the subjects in accordance with the experimental manipulation.

(3) The third through eighth sessions were role playing sessions in which the leaders assumed the role of subjects while one trainee was the leader. All trainees were exposed to the role of authoritative and participative leaders. Critiquing of specific leader behaviors by both the experimenter and trainees occurred throughout these sessions.

(4) The ninth through eleventh sessions involved videotaping of role playing sessions. All trainees were afforded the opportunity to assume both leadership roles during these sessions. Trainees were able to view themselves during playbacks and adjust behaviors that were incongruent with the conceptual definitions previously developed.

(5) During the twelfth session the seven trainees and the experimenter discussed the ability of each trainee to appropriately assume both leadership roles. Individual differences in trainees' comfort and effectiveness in each role were candidly noted. After reviewing the role performance of each trainee the experimenter and trainees jointly decided on the four trainees that exhibited the greatest proficiency in adapting the leadership roles. These four trainees were then chosen as the leaders for this experiment.

(6) The final training session consisted of a pre-test with volunteer subjects working in groups. Each of the four chosen leaders supervised a group of trial subjects in the completion of the tasks actually used in the experiment.

It should be noted that at no time during the training sessions were the leaders informed of the correct solutions to the experimental tasks. Emphasis was placed on developing behaviors that were in accordance with conceptual definitions. To this end, each leader was provided with a list of behavioral guidelines that specified the prescribed roles of both the authoritative and

participative leaders. These guidelines were available to leaders during experimental sessions and are listed below:

Authoritative

1. Use I instead of we.
2. Direct communication to yourself.
3. Establish control of process early.
4. Compliment and criticize on a personal basis.
5. Call on subjects one by one.
6. Remind group of time constraints and appeal to logic.
7. Do not be punitive.

Participative

1. Summarize.
2. Present alternatives.
3. Probe when there is early consensus.
4. Involve all group members.
5. Allow the group to make the decision.
6. Emphasize when a decision has been made.

Manipulation Check

In order to assess the effectiveness of the experimental manipulation all subjects rated their leaders on the following items on six point Likert scales, ranging from "very great extent" to "to no extent", (adopted from Price, 1973).

1. To what extent did the leader try to influence the decisions made by the group?
2. To what extent did the leader encourage communication among all members of the group?
3. To what extent was the leader considerate of the feelings of other group members?
4. To what extent did the leader stimulate members of the group to make contributions to the solution?
5. To what extent did the leader ask for suggestions from the group?
6. To what extent did the leader use the suggestions of other members of the group in attempting to reach a solution to the problem?

7. To what extent did the group, excluding the leader, actually derive the solution?

If the training of the leaders was successful it should follow that authoritative leaders would be perceived as higher on influence (item 1) while participative leaders would be higher on encouragement of communication, stimulation of contributions, suggestion solicitation, use of suggestions and group derivation of solution (items 2, 4, 5, 6, and 7). No difference between leadership styles should be found in consideration (item 3). This was expected because of the training which stressed the non-punitive nature of authoritative leadership.

In order to assess the effectiveness of the manipulation a multivariate analysis of variance was performed on all seven items. Because the multivariate test was significant, univariate analyses of variance were performed.

The Experimental Tasks

The selection of the experimental tasks for this study required consideration of a number of issues. It was felt that appropriate tasks needed to meet the criteria listed below:

1. The success of task performance (productivity) can be measured.
2. The tasks should be of such a nature that groups have a greater likelihood of successful solution than individuals.
3. The task must be of sufficient interest to motivate the subjects and enlist their cooperation.
4. The tasks must focus on the same type of problem. The reason for this is twofold. First, groups should be able to draw upon previous experience in resolving new problems. Second, ongoing groups in organizational settings are typically faced with similar problems over time.

The tasks chosen for this experiment (see Appendix A) were the Desert Survival Situation (Experiential Learning Methods, 1974) and the Subarctic Survival Situation (Experiential Learning Methods, 1975). In each of these survival situations the group is presented with a list of items that remain in their possession after a fictional disaster has occurred. Their task is to rank order the items in terms of importance of each item to the group's survival.

The group's final solution can be compared to expert rankings and can be scored for correctness of the solution by summing the absolute difference between the group's ranking and that of the experts, thus satisfying the requirement of measurable productivity. Data gathered by the authors of these tasks have provided evidence that group solutions are superior to individual solutions, therefore satisfying the requirement of superiority of group solution. While there is no evidence pertaining to subject acceptance of the tasks, inspection of them and discussion with former participants indicated that cooperation could be expected. The requirement of similar tasks was satisfied by using two versions of the survival game.

Using Steiner's (1972) typology, the experimental tasks are unitary (cannot be meaningfully divided into subtasks), optimizing (success is a function of how closely the group approximates a pre-determined "best" or correct answer), and discretionary (members of the group are premitted to combine individual contributions in any manner they wish).

As noted by Steiner, "when an optimizing task is discretionary, the quality of the group product depends heavily upon the processes the group actually employs...actual productivity will fall

short of potential productivity to the extent that the group process is not in accord with prescribed process" (p. 35). Thus, actual productivity on these tasks depends upon two sources; human resources brought to the experiment and group process. It is assumed that human resources were distributed equally among groups because of the random assignment of subjects. Therefore, any differences in productivity should derive from differences in process utilized by authoritative and participative groups.

Dependent Variables

1. Productivity. The experimental task in this study is the solution of two standard survival problems. In each of the two versions of this task groups were asked to rank order a number of items according to their importance for the group's survival. The Desert Survival Situation and the Subarctic Survival Situation, each have an optimal solution provided by experts. A measure of the group's productivity was obtained by comparing the group's rank ordering of the items with that of the experts. The absolute difference between the group's ranking and that of the experts was summed and the resultant total deviation was considered a measure of productivity, with lower scores representing better solutions.

2. Indices of Group Growth. The second dependent variable to be examined in this study is a combination of interrelated indices of group growth. As noted earlier, the participative model is based on the notion that this system of leadership will have more positive effects on the prescribed interviewing processes than traditional system of leadership. The participative model does not,

however, specify what variables represent group growth. While one may legitimately include a large number of indices as representative of group growth, the specified selection of variables in this study is limited to include those that can reasonably be expected to develop within the constraints of the artificial nature of the groups used in this experiment while leading to fruitful research in the future. With this in mind, a description of the variables considered to represent some dimensions of group growth and methods of measurement follows:

A. Satisfaction. The first index of group growth to be examined in this study is satisfaction with the group. In a study conducted in a laboratory setting Anderson (1972) utilized a 28-item "Member Reaction Questionnaire" which, when factor analyzed, yielded six subscales. One of the six subscales was considered a measure of general satisfaction with the group and will be utilized in this study.

The general satisfaction with the group scale is considered to measure the degree to which subjects are satisfied with being a member of the group, with the type of interaction they experience and with their individual and group performance. The items that comprise this scale are scored on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree" and are listed below:

8. There was much disagreement among members of the group.
9. In both problem-solving sessions my opinion was given adequate consideration by the other members of the group.
10. I was quite satisfied with being a member of this group.
11. On the whole I was satisfied with my group's performance.

12. I felt inhibited from expressing my feelings during the group discussion.

B. Cohesiveness - Attitudinal Measure. Social psychologists have long been interested in what forces hold groups together and have investigated the relationship between cohesiveness and such variables as quantity and quality of interaction (Lott and Lott, 1961), influence on group members (Festinger, Schachter and Back, 1950), and satisfaction (Seashore, 1954).

Most researchers have utilized the conceptual definition of cohesiveness advanced by Festinger, Schachter and Back (1950) who stated that cohesiveness is "the resultant of all of the forces acting on members to remain in the group." The conceptual definition of cohesiveness in this study is the one advanced by Festinger et al., while the operational definition to be employed is that used by Anderson (1974) which is "the ability of groups to foster sufficiently strong bonds among all its members to enable them to interact, resisting all forces that would disrupt such relationships."

Anderson's (1972) factor analysis of the "Member Reaction Questionnaire" yielded a subscale which measures amount of influence exerted and received, involvement, unity and the desire to work with the same people. The following items comprise this cohesiveness subscale and were used in this study. All items are scored on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree".

13. I had considerable influence in determining my group's final solution to the tasks.
14. I felt a real sense of involvement with the group.
15. If I were taking part in another experiment, I would like working with these same people.

16. Rather than working as one unified group, it seemed the group worked in sub-groups or as individuals on these problems.
17. The group had a great deal of influence on my final ideas about what would be a good solution.

C. Cohesiveness - Behavioral Measure. As can be seen the previous measure of cohesiveness is based upon subjects' perception. In order to obtain a behavioral measure of cohesiveness subjects were asked to make a choice of remaining in their group or transferring to another group.

At the conclusion of the experimental session subjects were told that future sessions were likely. They were then given a Group Transfer Form (Anderson, 1972) which follows:

As you know this study involves a large number of people, participating in a group. Some students have not been at all happy with their group. They have asked to be changed to another group, for future sessions, where they might get along better with other group members. In these situations we will accommodate them. What we'd like to know now is, since there are other group situations available as a result of these changes:

- 1) Would you like to change your group for future sessions:

Yes ____ No ____

- 2) If you would like to change your group, which of the members of your current group would you like to be with?

1. _____
2. _____
3. _____
4. _____

The measure employed is the number of groups that are disrupted by members electing to transfer to other groups.

D. Commitment. The fourth component of group growth in this study is commitment which is defined as the extent to which an individual accepts group goals, and pledges himself to and engages in behavior leading to the attainment of those goals.

In order to measure commitment subjects were asked to respond to the following 7-point Likert items, ranging from "strongly disagree" to "strongly agree". These items were developed by the experimenter for this study.

18. I cared about whether or not my group attained good solutions to the problems.
19. I contributed a great deal to help my group attain good solutions to the problems.
20. I tried, to the best of my ability, to help the group attain good solutions to the problems.
21. I tried to make my opinions known during the problem-solving sessions.

In addition to the subjective measure of commitment subjects were asked to respond to the following behavioral index of commitment:

22. I would be willing to participate in similar problem-solving sessions.

Yes ____ No ____

E. Perceived Problem Solving Effectiveness. The fifth component of group growth in this study is perceived problem solving effectiveness which is defined as the extent to which the group perceives itself as effectively combining human resources in a manner that leads to effective problem solution. A measure of this variable was obtained by having subjects rate their group on the following 7-point Likert scales ranging from "strongly agree" to "strongly disagree". The items comprising this scale were developed by the experimenter for this investigation.

23. This group was well organized for the tasks we were to perform.
24. I think my group developed high quality solutions to these tasks.
25. My group was an effective problem-solving team.
26. My group would be capable of solving similar problems.
27. My group would be capable of solving different problems.

F. Consensus of Perception of Group Member Competence. The sixth component of group growth in this study is consensus of perception of group member competence which is defined as the extent to which group members agree upon the competence of individual group members. The inclusion of this variable in group growth is based on the notion that a mature group is one in which members are aware of the strengths and weaknesses of individual members and can, therefore, utilize their resources more efficiently.

In order to measure consensus of perception of group member competence subjects rank ordered group members from most competent to least competent on the following items (adopted from Borgatta, Cottrell and Mann, 1958):

28. Keeps group working on task at hand.
29. Provides best ideas.
30. Does most to keep group functioning as a smooth unit.
31. Best able to integrate information.
32. Makes other feel he understands them.
33. Is most cooperative.

Hypotheses

The following hypotheses were tested in this study:

1. Groups led by participative leaders will have significantly higher levels of indices of group growth than groups led by authoritative leaders.
 - 1a. Groups led by participative leaders will be significantly more satisfied than groups led by authoritative leaders.
 - 1b. Groups led by participative leaders will be significantly more cohesive than groups led by authoritative leaders.
 - 1c. Groups led by participative leaders will be significantly more committed than groups led by authoritative leaders.
 - 1d. Groups led by participative leaders will come to a significantly greater consensus of perception of group member competence than groups led by authoritative leaders.
 - 1e. Groups led by participative leaders will perceive themselves to have significantly greater problem solving effectiveness than groups led by authoritative leaders.
2. Groups led by participative leaders will have significantly greater productivity than groups led by authoritative leaders.

The analysis of the data (discussed more fully in the following chapter) will consist of cluster analysis of the group growth scales and multivariate analysis of variance.

Experimental Design

In order to examine the variables of interest, sixteen groups, comprised of a trained leader and four members, met for an hour and a half and worked, as a group, on two similar tasks. Seven leaders

were trained in both supervisory styles and the four most proficient then led two groups in an authoritative manner and two groups in a participative manner. The ordering of style used by leaders was counterbalanced to control for presentation effects. This was done by having two of the leaders supervise their first and fourth groups in an authoritative manner, while their second and third groups were led in the participative style. This ordering was reversed for the remaining two leaders, and yields the following design:

Leadership style

Authoritative	group 1 A	group 3 C	group 6 B	group 8 D	group 11 B	
Participative	group 2 B	group 4 D	group 5 A	group 7 C	group 9 A	
Authoritative	group 12 D	group 13 A	group 15 C			
Participative	group 10 C	group 14 B	group 16 D			

A = Leader number 1
 B = Leader number 2
 C = Leader number 3
 D = Leader number 4

Each group met for an hour and a half and solved two problems with a five minute break between tasks. Measures of the variables of interest were gathered at the times indicated on the following chart:

Measure	After Task 1	After Task 2
Productivity	X	X
Satisfaction		X
Cohesiveness		
A. Behavioral		X
B. Subjective		X
Commitment		X
Consensus of perception of group member competence		X
Problem-solving effectiveness		X
Leadership manipulation check		X

Subjects

The sample used in this study consisted of sixty-one male undergraduate students at Michigan State University. Fifty-two of the subjects were solicited by the experimenter from the following undergraduate psychology classes: Introductory Psychological Statistics, Legal and Criminal Psychology, Human Relations in the Work Setting, Consumer Psychology, and Personnel and Organizational Psychology. After receiving permission from the instructors of these classes the experimenter told the class that he was looking for subjects to participate in his doctoral research involved in group problem solving. Students were told that the tasks they would perform would be interesting and that they would work in groups. Potential subjects were also told that they would be paid three dollars for their participation and that there was a possibility that more than one session per group would be held. All students that were interested were told to place their name and phone number on a sheet

of paper and that the experimenter would contact them in the near future to set up an appointment.

In addition to the undergraduate psychology classes, subjects were also solicited from an advertisement in the school newspaper offering three dollars for participation in group problem solving research and a part-time employment notice at the Student Services offices. The remaining nine subjects came from these sources.

After sixty-four subjects, the number required by the design, had volunteered they were assigned to sixteen groups of four and contacted to confirm a time and date for participation. Care was taken to assure that no groups were comprised of subjects from the same classes in an effort to reduce the possibility of the subjects being familiar with one another. Three of the subjects failed to keep their appointments which resulted in the running of three-man groups in these situations.

The Procedure

Subjects were instructed, during the confirmation telephone call, to report to a designated room at a specific time. All experimental sessions were conducted in seminar rooms, at Michigan State University, that were identical in their dimensions.

The experimenter waited until five minutes after the designated time and then requested that all subjects sign a consent form. Subjects were told that they would be participating as a group on some problems for about one and a half hours, and that after completion they would fill out a seven-page questionnaire which would be followed by payment of three dollars. After this introduction was completed the experimenter exited and the leader entered the room.

All leaders were supplied with two scripts, one for each style of leadership, which can be found below.

Authoritative:

Thank you for coming tonight. My name is _____ and I'm assisting in some research involved in group problem solving. Before I explain the details of this project why don't we all introduce ourselves starting with you. (Leader points to the subject on his left.) (After all the introductions are completed Leader says) Okay. Let me tell you about the task that we're going to perform. It's called the Desert Survival (Subarctic Survival) Situation and my task is to lead this group to an optimal solution. If you will all read the instructions silently while I read them aloud I'm sure the task we're going to perform will become clear. (Leader gives subjects the task and reads instructions.) If there are no questions I'd like everybody to rank these items individually. I'll give you ten minutes to do this. (After ten minutes have elapsed the leader says) Let's move on to the group solution. My experience with this type of problem has been that the most efficient method of combining the individual rankings into a group solution is to take them one at a time and direct all of your comments to me.

Participative:

Thank you for coming tonight. My name is _____ and I'm assisting in some research involved in group problem solving. Before I explain the details of this project why don't we all introduce ourselves. (Pauses and allows subjects to introduce themselves.) We're going to solve two problems tonight; one is the Desert Survival Situation and the other is the Subarctic Survival Situation. Each will take about 45 minutes and we'll take a five minute break in between. Our task will be to derive optimal solutions to these problems. (Hands out first problem) Let's all read the instructions. (After having allowed enough time for each subject to read the instructions silently) Are we ready to begin now? Okay, why don't we take about ten minutes to do step 1. After you've completed this step spend some time thinking about how we can combine the individual solutions into a group solution. (After step 1 is completed) It seems that we ought to spend some time deciding how to combine the individual rankings. What are the possible ways we can go about this?

After both tasks had been completed the group leader exited and the experimenter returned. Subjects were then given the questionnaire and were instructed to include their leader in all

questions about the group with the exception of items 28 through 33. Leaders were excluded from items 28 through 33 because these items assess the amount of agreement among group members in terms of their competence. In this context, the leader is not seen as a member of the work group. After all subjects had responded to the questionnaire the experimenter told them that the purpose of the experiment could not be explained until all of the groups had been run and that they would be called in the near future to schedule a time for debriefing. Subjects were then asked to sign a payment voucher and were given three dollars.

Debriefing

When all sixteen groups had been run the experimenter telephoned each subject and scheduled an appointment to explain the purpose of the research. Any questions the subjects had were answered at this time.

CHAPTER III

ANALYSIS AND RESULTS

Analysis

The indices of group growth used in this study were either drawn from previous research or developed by the experimenter. In order to determine the empirical relationships among and within the group growth scales, a cluster analysis was performed (Hunter, 1973). This analysis provided information concerning the inter-item correlations and the internal consistency (reliability) of each scale. The items that showed very weak empirical relationships with their scales were dropped from further analysis.

Each index of group growth is conceptualized to operate as one of a number of highly interrelated components of growth. The primary concern of this study is to determine the differential effects of authoritative and participative leadership on these indices of group growth. A test of the differential effects of supervisory style must be sensitive to the interdependent nature of the group growth indices. Accordingly, group scale scores for each index of growth were computed for each group by taking the mean response of all group members on all items, remaining after cluster analysis, within each scale. These group scale scores were then submitted to a multivariate analysis of variance to test the hypotheses.

The design of this experiment had two leadership styles with four leaders presenting each style twice. Subjects were nested within groups which were further nested within leader and leadership style combinations. In order to conclude that the results can be interpreted in terms of only leadership style, it was first necessary to test for the possibility of significant leader by style interaction effects and leader practice effects. Had either of these factors evidenced significant effects any resulting differences in the dependent measures could not be attributed solely to leadership style, the variable of primary interest.

In order to test for these possibilities a 2×4 (leadership style by leader) factorial analysis of covariance design was utilized. The possibility of contamination due to leader practice effects was evaluated by using the dichotomous variable of first or second occasion as a covariate. If the covariate, the main effect of leaders and the interaction of leadership style and leaders were not statistically significant, it would be concluded that these factors did not substantially affect the results. This finding would permit the occasion and leader variables to be pooled, yielding a two-group, one-way multivariate analysis of variance.

This analysis was performed after testing for the potential contaminating factors described above. A significant leadership style main effect would allow for univariate testing of each index of group growth.

All tests were performed at the .05 level of significance.

Manipulation Check

In order to assess the effectiveness of the experimental manipulation of leadership style the responses of the subjects in the authoritative and participative conditions were compared through a multivariate analysis of variance on the seven items which comprised the manipulation check. As expected, the multivariate analysis revealed a significant manipulation effect ($F = 8.75$, $df = 7/53$, $p < .0001$). This finding was followed by subsequent univariate tests of each item which are shown in Table 1.

Inspection of the univariate tests show that subjects in the authoritative condition saw their leaders as exerting significantly more influence than did the subjects in the participative condition. Subjects in the participative condition saw their leaders as encouraging communication, being considerate of their feelings, stimulating contributions, and asking for and using suggestions to a significantly greater extent than subjects in the authoritative condition. Participative subjects also reported that the group actually derived the solution to a significantly greater extent than authoritative subjects.

With the exception of the item concerning leader consideration of group members' feelings, all subjects' perceptions of their leaders were in the predicted direction and statistically significant. Taken as a whole, the results of this test provide strong evidence for the success of the experimental manipulation. The possible effects of perceived consideration of leaders is examined in a later portion of this chapter.

Table 1. - Means and F-ratios for Manipulation Check Items.

<u>Item</u>	<u>Mean for Subjects in Authoritative Condition (N = 30)</u>	<u>Mean for Subjects in Participative Condition (N = 31)</u>	<u>F-ratio</u>
1. To what extent did the leader try to influence the decisions made by the group?	5.17	4.29	19.99**
2. To what extent did the leader encourage communication among all members of the group?	3.30	4.61	21.05**
3. To what extent was the leader considerate of the feelings of other group members?	3.77	4.64	17.16*
4. To what extent did the leader stimulate members to make contributions to the solution?	3.23	4.55	23.92**
5. To what extent did the leader ask for suggestions from the group?	3.60	5.00	34.43**
6. To what extent did the leader use the suggestions of other members of the group in attempting to reach a solution to the problem?	3.27	4.77	33.36**
7. To what extent did the group, excluding the leader, actually derive the solution?	2.97	4.61	33.71**

** p < .0001

* p < .001

Cluster Analysis of the Scales

As mentioned earlier, the scales for each index of group growth were developed on an a priori basis. Accordingly, cluster analysis, with the items comprising each scale defined in advance, was performed to examine the empirical relationships within and between scales. The results of this analysis revealed that two items were essentially unrelated to their scales.

The first of these, "There was much disagreement among members of the group", was from the satisfaction scale and had a mean intercorrelation of $-.14$ with the remaining items from this scale versus a mean intercorrelation of $.61$ for remaining items. The second item, "I would be willing to participate in similar problem-solving sessions", was from the commitment scale and had a mean intercorrelation of $-.09$ with the remaining items from this scale versus a mean intercorrelation of $.36$ for remaining items. Because of these weak relationships these two items were omitted from further analysis.

A second cluster analysis was performed on the remaining items. Obtained inter- and intra-item and scale correlations can be found in Appendix B. Internal consistency reliabilities for each scale were $.87$ for satisfaction, $.70$ for cohesiveness, $.60$ for commitment and $.80$ for perceived problem-solving effectiveness.

Inspection of Appendix B reveals that some items correlate more highly with some other scales than with the scale in which they are included. This result will be treated more fully in the discussion section.

Multivariate Analysis of Variance

The primary concern of this study is to examine the differential effects of authoritative and participative leadership on the indices of group growth. Before a two-group one-way multivariate analysis of variance on leadership style could be performed it was first necessary to establish that other factors did not significantly affect the results. As noted earlier, each of the four trained leaders led two groups in both the authoritative and participative conditions. In order to test for the effects of practice in each leadership role a 2×4 (style by leader) multivariate analysis of variance, with time adjusted as a covariate, was performed.

The results of this analysis indicated that practice had a non-significant effect on the results ($F = 1.04$, $df = 5/3$, $p < .52$). This analysis also revealed that the style by leader interaction was non-significant ($F = .89$, $df = 3/7$, $p < .60$). The multivariate test for leader main effects was also non-significant ($F = 1.94$, $df = 3/7$, $p < .17$). These results, then, provide evidence that there were no significant practice effects, no style by leader interaction and no leader main effects. These non-significant findings allowed for a test of leadership style effects through a one-way multivariate analysis of variance.

Hypothesis 1.

The first hypothesis predicted that groups led by participative leaders would have significantly higher levels on indices of group growth than groups led by authoritative leaders. A one-way multivariate analysis of variance revealed that there was a statistically

significant leadership style effect on the indices of group growth ($F = 3.57$, $df = 5/10$, $p < .04$). Inspection on the means of each of the dependent measures (to be discussed individually) revealed that these differences were in the hypothesized direction. The significant multivariate effect justified inspection of the univariate analyses of variance which are presented in Table 2.

Hypothesis 1a.

Hypothesis 1a predicted that groups led by participative leaders would be significantly more satisfied than groups led by authoritative leaders. The computed mean satisfaction scores for participatively and authoritatively led groups were 5.84 and 4.68 respectively. The analysis of variance revealed a significant difference between participatively and authoritatively led groups in terms of satisfaction ($F = 14.87$, $df = 1/14$, $p < .002$) in the hypothesized direction, thus supporting hypothesis 1a.

Hypothesis 1b.

Hypothesis 1b predicted that groups led by participative leaders would be significantly more cohesive than groups led by authoritative leaders. It will be recalled that there were two measures of cohesiveness; a five-item perceptual scale and a behavioral item asking subjects if they would like to change their group for future sessions.

An analysis of variance on the five-item perceptual measure revealed a significant difference in cohesiveness of groups led by authoritative and participative leaders ($F = 16.09$, $df = 1/14$, $p < .002$). The mean cohesiveness score for participatively led groups

Table 2. - Means, Standard Deviations and F-ratios for Group Growth Indices

Group, Growth Index	Means for Participatively Led Groups (N = 8)		Means for Authoritatively Led Groups (N = 8)		F-ratio
	Standard Deviations	Standard Deviations	Standard Deviations	Standard Deviations	
Satisfaction	5.84	.33	4.68	.78	14.87**
Cohesiveness	5.25	.33	4.17	.69	16.09**
Commitment	5.93	.28	5.30	.53	8.71*
Consensus of Perception of Group Member Competence	.35	.26	.42	.35	.23
Perceived Problem Solving Effectiveness	5.31	.38	4.66	.68	5.52*

**p < .01

*p < .05

was 5.25 compared to a mean of 4.17 for authoritatively led groups. This result is in the hypothesized direction and supports hypothesis 1b.

The number of groups disrupted by members stating they preferred to work with another group in future sessions was the behavioral measure of cohesiveness. Of the eight groups led by participative leaders, four were disrupted by members asking to transfer, while seven of the eight authoritatively led groups were disrupted. The chi square test on this data was nonsignificant ($\chi^2 = 2.58$, $df = 1$, $p < .15$). Although the results were in the hypothesized direction, the difference in number of groups disrupted was not large enough to be considered as support for hypothesis 1b.

Hypothesis 1c.

Hypothesis 1c predicted that groups led by participative leaders would be significantly more committed than groups led by authoritative leaders. The mean commitment score for groups led by participative leaders was 5.93 in contrast to a mean commitment score of 5.30 for groups led by authoritative leaders. The analysis of variance revealed a significant difference in group commitment ($F = 8.71$, $df = 1/14$, $p < .02$) which supports hypothesis 1c.

Hypothesis 1d.

Hypothesis 1d predicted that groups led by participative leaders would come to a significantly greater consensus on perception of group member competence than groups led by authoritative leaders. Each group member was required to rank all members of their group on seven items in order of their competence. In order to assess the

degree of consensus in these rankings Kendall's Coefficient of Concordance (Siegel, 1956, pp. 229-238) was computed for each group. A conversion of each Coefficient of Concordance to a Rank-Order Correlation Coefficient was performed which was followed by an r to Fisher's z transformation. The seven z scores for each group were then averaged and reconverted to one correlation for each group, representing the degree of consensus of group member competence. This procedure yielded an average correlation of .42 for authoritative groups and .35 for participative groups. It will be recalled, however, that two of the authoritative, and one of the participative, groups were comprised of only three members. The smaller number of members in these groups served to reduce the variance in rankings which resulted in very high agreement on some items. The effect of this was to produce extremely high z values which had a biasing effect on the final average correlation for each group.

A second analysis using data from only the four-man groups was performed. The same procedure outlined above was followed and the average correlation for participative groups was .29 while the average correlation for authoritative groups was .26. This difference, while in the hypothesised direction, was far too small to reach statistical significance and must be taken as lack of support for hypothesis 1d.

Hypothesis 1e.

Hypothesis 1e predicted that groups led by participative leaders would perceive themselves to have significantly greater problem effectiveness than groups led by authoritative leaders. The

perceived problem solving effectiveness score for participatively led groups was 5.31 while the mean for authoritatively led groups was 4.66. The analysis of variance revealed that this difference was significant ($F = 5.52$, $df = 1/14$, $p < .05$) and thus provides support for hypothesis 1e.

Hypothesis 2

Hypothesis 2 predicted that groups led by participative leaders would have significantly greater productivity than groups led by authoritative leaders.

In order to test this hypothesis, the summed absolute values of the deviations of the group rankings of items from the expert rankings for both the Desert Survival Situation and the Subarctic Survival Situation were converted to z-scores. The analysis of variance revealed no time effect. It also showed that the average productivity of authoritatively led groups was higher than the productivity of participatively led groups. The difference was not, however, statistically significant ($F = 4.45$, $df = 1/14$, $p < .08$).

Univariate Analysis of Variance with Consideration Adjusted as a Covariate

The results of the manipulation check revealed that all subject perceptions of their leaders were in the predicted direction, with the exception of the consideration item. Because the training of the leaders stressed the non-punitive nature of authoritative leadership, it had been predicted that there would be no significant differences in the subjects' perception of the consideration of authoritative and participative leaders. The results revealed, however,

that subjects in the participative condition saw their leaders as being significantly more considerate than subjects in the authoritative condition. In order to examine the effects of perceived leader consideration, the univariate analyses of variance on satisfaction with the group, cohesiveness, commitment, and perceived problem solving efficiency were calculated with adjustment for the group consideration scores as a covariate.

The results of this analysis indicate that consideration was not significant as a covariate ($F = .73$, $df = 4/10$, $p < .59$). Examination of the univariate F-ratios, however, revealed that when adjustment was made for the covariate, the significance of the differences between authoritatively and participatively led groups was reduced. This analysis revealed that the difference between authoritatively and participatively led groups on commitment and perceived problem solving efficiency was not statistically significant. Differences on cohesiveness ($F = 3.64$, $df = 1/13$, $p < .07$) and satisfaction ($F = 4.85$, $df = 1/13$, $p < .05$) were marginally significant.

Summary of Results

1. The experimental manipulation was successful.
2. The effects of practice and individual leader effects were non-significant and did not interact with the leadership style manipulation.
3. Participatively led groups exhibited significantly greater levels of growth than authoritatively led groups, thus supporting hypothesis 1.
4. Satisfaction with the group was significantly greater in groups led by participative leaders than in groups led by authoritative leaders, thus supporting hypothesis 1a.

5. Cohesiveness, as measured by the attitudinal index, was significantly greater in groups led by participative leaders than in groups led by authoritative leaders, thus supporting hypothesis 1b. The behavioral index of cohesiveness revealed no significant difference between groups led by participative and authoritative leaders.
6. Commitment was significantly greater in groups led by participative leaders than in groups led by authoritative leaders, thus supporting hypothesis 1c.
7. The difference between participatively and authoritatively led groups in consensus of perception of group member competence was not significant, thus failing to support hypothesis 1d.
8. Perceived problem solving effectiveness was significantly greater in groups led by participative leaders than in groups led by authoritative leaders, thus supporting hypothesis 1e.
9. No significant difference was found in the productivity of groups led by participative and authoritative leaders, thus failing to support hypothesis 2.
10. Univariate analyses of variance with consideration adjusted as a covariate revealed no significant overall effect for consideration. The univariate F-ratios for commitment and perceived problem solving efficiency, however, were not significant when consideration was adjusted as a covariate. Cohesiveness and satisfaction were marginally significant after the adjustment.

CHAPTER IV

DISCUSSION

The general question addressed in this study is whether or not participative and authoritative leadership are differentially related to outcomes considered to represent some aspects of group growth. In order to examine this question a number of indices of growth were measured in problem solving groups led by either participative or authoritative leaders. These measures were then analyzed by a multivariate test which revealed statistically significant differences between authoritatively and participatively led groups on these indices of group growth. This finding supports the first hypothesis which predicted higher levels of growth in groups led by participative leaders than in groups led by authoritative leaders.

The finding of a significant multivariate effect on leadership style allowed for univariate testing of the sub-hypotheses. Each index of group growth was tested separately, through univariate analysis of variance. The results of these univariate tests provided support for all but two of the sub-hypotheses.

The first of the non-supported hypotheses predicted that groups led by participative leaders would come to a significantly greater consensus of perception of group member competence than groups led by authoritative leaders. The initial analysis of the group

rankings revealed that the authoritatively led groups had greater consensus in their rankings than participatively led groups. The difference was not, however, statistically significant.

Because three-man groups were included in this analysis, the variance in group rankings was reduced. This resulted in high correlations among group members' rankings which, when transformed to Fisher z scores, yielded extremely high values. In order to eliminate the bias of these three-man groups, a second analysis, using only four-men groups was conducted. The results of this analysis indicated greater consensus in the participatively led groups. The difference, however, was extremely small and cannot be considered as acceptable evidence in support of the hypothesis. The question that arises from this finding is why members of participatively led groups failed to reach consensus in their rankings of each others' competence.

Participative decision making, in theory, leads to positive changes in a number of intervening individual and group processes which ultimately lead to positive changes in group effectiveness. The participative model assumes that all members of the organization are capable of contributing creative inputs to organizational problems. It would seem, however, that before these capabilities become apparent, group members must undergo a number of perceptual changes. The positive attitudinal changes, such as increased commitment, satisfaction with the group and cohesion, brought about by participation, creates a climate in which group members mutually explore the resources existing within the group. When there is an understanding among work group members of where those resources lie the

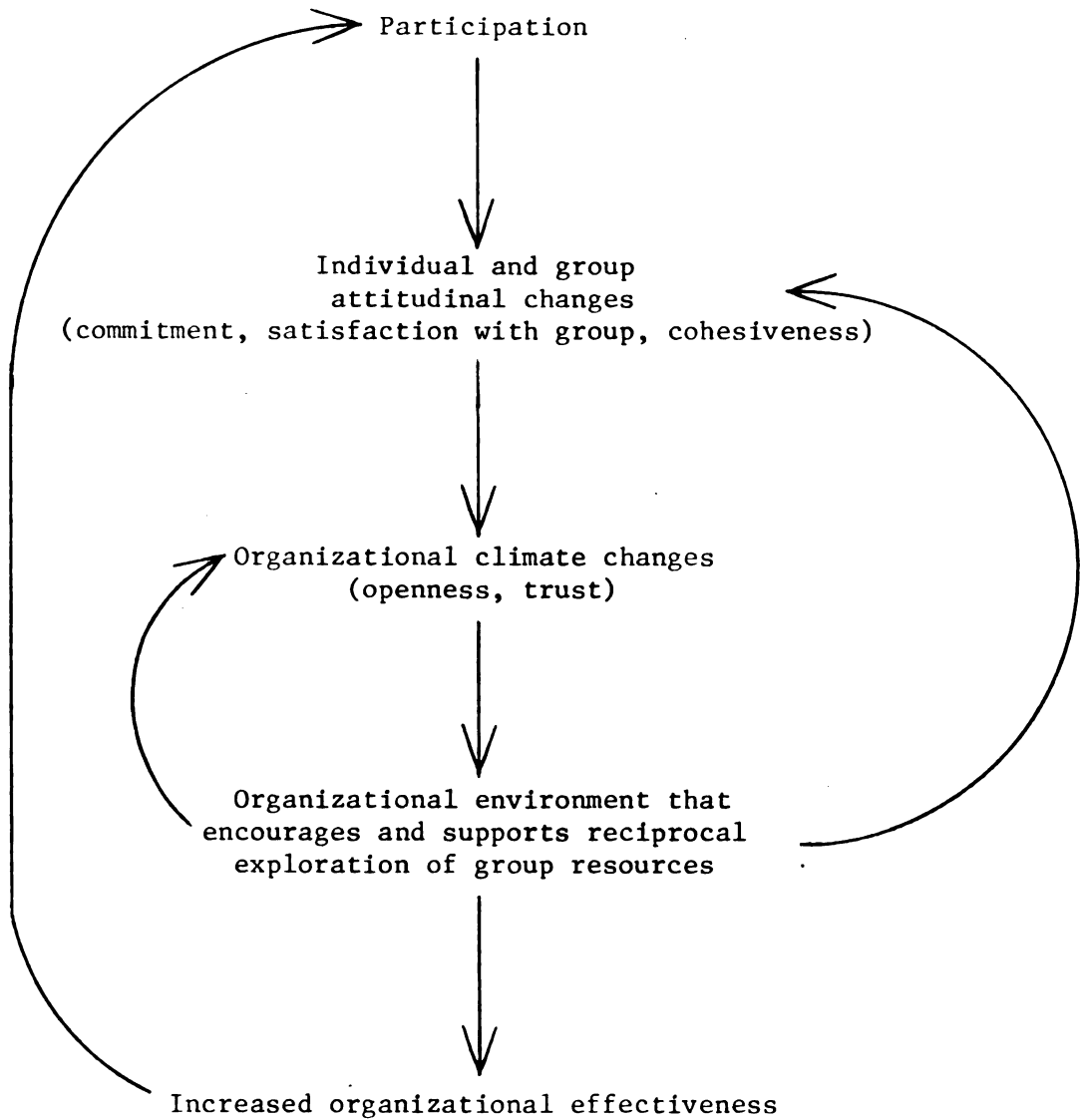
organizational climate will encourage the translation of these resources into increased organizational efficiency. This chain of events is portrayed in Figure 1.

This interpretation suggests that participative leadership brings about a sequence of change events that requires a certain amount of time to occur. The outcome of this sequence of changes is clearer understanding among work group members of how their existing resources can best be utilized to increase productivity. The failure of the results to support the consensus of perception of group member competence hypothesis, when placed in this framework, may be interpreted to indicate that the limited time span of this experiment did not allow the sequential chain to reach completion. In essence, an hour and a half may not have been sufficient time for members of the problem solving groups in this experiment to gather enough information about each other to make accurate assessments of their competence.

If the time constraint of this study prevented group members from accurately assessing each others' competence, it would follow that increased productivity from this source (the group) would not be realized. This logic is consistent with the finding that authoritatively led groups had higher levels of productivity than participatively led groups. As noted by Likert (1967), participation does not lead to automatic gains in productivity, but instead requires time for intervening processes to occur which will ultimately lead to increased organizational efficiency.

The finding in this study of slightly (non-significant) higher levels of productivity in groups led by authoritative leaders parallels

Figure 1 - Sequential Development in Participative Organizations.



the results of an investigation of leadership style and group accuracy conducted by Cammalleri et al. (1973). The experimenters exposed thirty-two groups of four or five United States Air Force Academy cadets to either authoritarian or democratic supervision. The task to be solved by these groups was the National Aeronautic Space Administration (NASA) Decision-Making Problem which requires the group to rank a number of items in terms of their importance for survival on the moon. This task is very comparable to the problems faced by the groups in the present investigation.

The leaders in the Cammalleri et al. study were given the correct solution to the NASA problem and were instructed to lead their groups toward either a highly accurate or inaccurate solution. The results of the Cammalleri et al. study revealed that groups led by authoritative leaders in the high accuracy condition produced the most accurate solutions. The next most accurate solutions were produced by democratic leaders in the high accuracy condition followed by democratic low accuracy and authoritative low accuracy conditions.

While the leaders in the present study were not informed of the correct solutions to the Desert Survival Situation or the Sub-arctic Survival Situation, they were exposed to these problems during the role playing sessions of their training. It is reasonable to assume that the interactions during the role playing sessions provided the leaders with a close approximation of the correct solutions which were then carried with them to the actual experiment. Because the participative leaders were trained to encourage and use group member contributions in arriving at solutions they may have accepted arguments that the authoritative leaders could more easily disregard.

In summary, it appears that the failure of participatively led groups to produce more accurate solutions than authoritatively led groups may be due to the lack of sufficient time for the groups to develop their own resources. Furthermore, the superior productivity of authoritatively led groups may be partially attributable to the extent to which accurate solutions were transmitted to the groups by the leader. This interpretation is consistent with the findings of Cammalleri et al. .

The participative organizational model considers three broad classes of variables; causal, intervening, and end-result. As mentioned earlier, the posited relationship between participative leadership as a causal variable and end-result variable attainment requires time for intervening attitudinal changes to occur. While the time span of this experiment was too limited to allow for the type of group growth required to affect end-result variable attainment, the results do provide information pertaining to the effects of leadership style on the intervening attitudinal changes which are proposed to occur in the participative model.

With the exception of the two non-supported hypotheses noted above, the results of this study clearly support the predicted relationship of higher levels of growth indices in groups led by participative leaders than in groups led by authoritative leaders. Statistically significant differences between groups led by authoritative and participative leaders were found in the multivariate analysis of variance and the subsequent univariate analyses on satisfaction with the group, cohesion, commitment, and perceived problem solving efficiency.

Data from this study suggests that only the first part of the sequence was completed. There was no relationship found between participative leadership and consensus about competence, nor participative leadership and productivity. The findings of this investigation reveal that during the initial stage of group development, participative leadership has a more positive effect on growth indices than authoritative leadership. When group members are afforded the opportunity to participate in decisions they report greater cohesiveness, commitment and satisfaction than when they are led in an authoritative manner. In addition, groups that are allowed to actively participate in the generation of solutions perceive themselves as being better problem solvers than groups which have little impact on final decisions. This is true in spite of the fact that the groups in this experiment that were supervised by authoritative leaders produced more accurate solutions than groups led by participative leaders. Taken as a whole, these results provide evidence for the greater relative effectiveness of participative leadership over authoritative leadership as a causal variable in producing the changes in the intervening processes described by Likert's (1967) model.

Intervening Processes

The intervening processes described by Likert are seen as interactive in nature. It is posited that participative supervision will produce a series of positive interdependent attitudinal changes which will ultimately lead to greater organizational efficiency than is found in traditional organizations. While the indices of group growth examined in this study are conceptually distinct, the empirical

relationships among them reveal high intercorrelations. The inter-scale correlations may reflect the highly interdependent relationships that Likert describes as existing among the intervening variables.

This interpretation of interdependence is further supported by the step down F-ratios which are performed with the multivariate analysis of variance. Step down F-ratios represent the results of univariate tests which are conditioned on the distributions of previously entered variables. In this study, this can be conceptually thought of as analogous to using the first index entered in the computer as a covariate. The step down F-ratios (Appendix C) show that, in general, by conditioning in any of the group growth indices the remaining differences between authoritatively and participatively led groups are not statistically significant. Those step down F-ratios that are statistically significant do not appear to form any systematic pattern and are essentially uninterpretable.

The high inter-relationships among the scales revealed by the inter-scale correlations and the step down F-ratios raises the question of the actual nature of the intervening processes involved in the participative model.

The findings tentatively suggest that the indices investigated interact and represent a general positive affective response to participation. It is possible, however, that the indices are sequentially related and that further research, utilizing purer scales in a longitudinal framework, will reveal their sequential nature. While the results of this experiment clearly support the effectiveness of participative supervision during the initial stage

of growth, the design does not allow for an investigation of any possible sequential relationships among the indices of growth utilized in this study.

Longitudinal research would allow for a more comprehensive examination of the effects of supervisory style on group growth than is provided in this study. The strength of the findings of an association between leadership style and initial group growth indices within the constraints of this exploratory study should serve as a starting point from which extended examination of group growth in organizational settings evolves.

Limitations on Interpretation of Findings

The use of college students working in artificially created groups places additional limitations on the generalizability of the results. Student subjects receiving pay for working in groups in which they have minimal historical relationships among themselves and their leader surely respond to experimental conditions in a different manner than ongoing work groups. The positive effects of participative leadership on initial growth indices in this laboratory study cannot be assumed to occur with the same amount of rapidity in organizational settings.

The inherent limitations of a laboratory study may be related to the findings concerning subjects' perceptions of leader consideration. It will be recalled that contrary to the predicted outcome, groups led in a participative manner perceived their leaders to be significantly more considerate of group members' feelings than groups led in an authoritative manner. The effects of this perception were

tested by performing univariate analyses of covariance with group consideration scores as a covariate on the indices that had shown significant differences between participatively and authoritatively led groups.

When this adjustment was made the difference between authoritatively and participatively led groups on commitment and perceived problem solving efficiency was not statistically significant. Differences on cohesiveness and satisfaction with the group remained marginally significant after the adjustment for the covariate.

There appear to be two interpretations of this finding. The first of these lies in the nature of the present investigation. While leaders were trained to be non-punitive in the authoritative condition, group members were limited in their interactions with their leaders. Since the groups in this investigation did not have any historical relationships, their opinions of their leaders were formed on the basis of this limited interaction. It would seem reasonable to believe that when group members were asked to report on the extent to which their leader was considerate of their feelings their responses were based on a general perception of their leader. Because of the nature of authoritative leadership, this general perception may have been less favorable than that of the participative leaders. If this is the case, the perception of lower levels of consideration in authoritatively led groups would be expected.

Another possible cause of this finding may lie in the consideration index used in this study. Since only one item was used to measure perceived leader consideration, the reliability of this index

must be questioned. It is possible that a scale with greater reliability would have produced a result different from the one found in this study.

A second interpretation of this finding may lie in the differences between participation and consideration. Conceptually, one could argue that participation and consideration represent separate dimensions of leadership behavior. McMurray (1958) presents such an argument with his example of the benevolent autocrat who is highly considerate of his subordinates but severely restricts their participation. Yukl (1971) also advances a theoretical argument for the conceptual distinction between consideration, initiation of structure and participation.

Johnson (1973) investigated the relationship between initiation of structure, consideration, and participation. Using multi-dimensional scaling, he found that participation was a distinguishable third dimension of leadership behavior. Johnson also reports that while these dimensions are conceptually distinct, they are correlated with one another. This position is consistent with the findings of this investigation. While participation can be conceived of as distinct from consideration, the results of this study indicate that the two are somewhat related.

In addition to these limiting factors, further constraints are placed on the findings by situational variables that were not examined in this study. These include individual personality characteristics, type of task, and organizational size, among others.

In summary, it would appear that the relationship between consideration and participation is in need of further investigation.

In order to understand the association between dimensions of leadership behavior, longitudinal research in field settings should be conducted. These settings would allow for the historical framework, within which supervisors and subordinates operate, to be incorporated into the examination.

Implications

The results of this study seem to imply that organizations utilizing the participative model must allow time for attitudinal changes to occur before increased organizational efficiency can be expected. Work group members that have long established relationships among themselves and management cannot be expected to instantaneously develop the positive attitudes which represent the first link in the growth sequence. If the relationship between management and the rank-and-file workers has been one of distrust and manipulation, it can be expected that the time and effort needed to positively influence the intervening processes will increase. An organization that perceives participation only as a device to increase productivity may encounter attitudinal resistance among workers.

Organizations that implement participative models on a partial basis will fail to fully tap the resources that exist within work groups. The full impact of participation will not be realized unless the total organizational system is involved. This requires the use of the three basic mechanisms, described by Likert, of supportive relationships, overlapping work group structure and high performance aspirations throughout the organization. Increased productivity cannot be viewed as an end in and of itself, but

instead should be seen as a by-product of the participative system. These implications are based upon the unproven assumption that the attitudinal changes that accompany participative leadership represent the first link in a sequential chain that leads to increased organizational effectiveness.

It has been argued that the level of growth of work groups is a fundamental determinant of their effectiveness. If this is true, the question of alternative strategies to develop groups arises. One may speculate that under certain conditions authoritative leadership may induce more rapid growth than participative leadership. If group members uniformly perceive an authoritative leader as a frustrating agent they may unite and become cohesive and committed to one another in reaction to this type of supervision. Under certain conditions this strategy may be more effective in producing growth than a participative strategy.

When the sequential chain of development is more fully understood it may become apparent that mixed leadership strategies are most effective for the development of growth. Varying degrees of participative and authoritative supervision may be appropriate at different times in the growth process. Task and environmental considerations may dictate the most effective pattern of leadership in a given situation. Models that address these questions are presented by Vroom and Yetton (1973) and Fiedler (1967). A fuller understanding of the growth process will provide valuable contributions to existing knowledge of leadership.

In summary, it appears that the results of this exploratory investigation are indicative of a positive relationship between

participative supervision and indices of initial group growth. While this study provides evidence for the positive initial effects of participative leadership, more questions are raised than are answered by this research. Some of these questions have been discussed in the preceding pages. Until future research more fully explores the process of group growth and its relationship to leadership, organizations will be basing their practices on speculation rather than sound empirical evidence.

APPENDICES

APPENDIX A

Desert Survival Situation

Subarctic Survival Situation

THE DESERT SURVIVAL SITUATION

A GROUP DECISION MAKING EXPERIENCE FOR EXAMINING
AND INCREASING INDIVIDUAL AND TEAM EFFECTIVENESS

Developed by
HUMAN SYNERGISTICS

J. CLAYTON LAFFERTY, PH.D.
Consulting Psychologist

PATRICK M. EADY, M.Ed.

in consultation with
ALONZO W. POND, M.A.
Former Chief of Desert Branch
Arctic, Desert, Tropic Information Center
Air University, Maxwell Air Force Base

The situation described in this exercise is based on over 2,000 actual cases in which men and women lived or died depending upon the survival decisions they made. Your "life" or "death" will depend upon how well your group can share its present knowledge of a relatively unfamiliar problem so that the team can make decisions that will lead to your survival.

When instructed, read about the situation and do Step 1 without discussing it with the rest of the group.

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THE SITUATION

It is approximately 10:00 A.M. in mid August and you have just crash landed in the Sonora Desert in southwestern United States. The light twin engine plane, containing the bodies of the pilot and the co-pilot, has completely burned. Only the air frame remains. None of the rest of you have been injured.

The pilot was unable to notify anyone of your position before the crash. However, he had indicated before impact that you were 70 miles south-southwest from a mining camp which is the nearest known habitation, and that you were approximately 65 miles off the course that was filed in your VFR Flight Plan.

The immediate area is quite flat and except for occasional barrel and saguaro cacti appears to be rather barren. The last weather report indicated the temperature would reach 110° that day, which means that the temperature at ground level will be 130°. You are dressed in light weight clothing – short sleeved shirts, pants, socks and street shoes. Everyone has a handkerchief. Collectively, your pockets contain \$2.83 in change, \$85.00 in bills, a pack of cigarettes, and a ballpoint pen.

YOUR TASK

Before the plane caught fire your group was able to salvage the 15 items listed on the next page. Your task is to rank these items according to their importance to your survival, starting with "1" the most important, to "15" the least important.

You may assume –

1. the number of survivors is the same as the number on your team;
2. you are the actual people in the situation;
3. the team has agreed to stick together;
4. all items are in good condition.

Step 1: Each member of the team is to individually rank each item. Do not discuss the situation or problem until each member has finished the individual ranking.

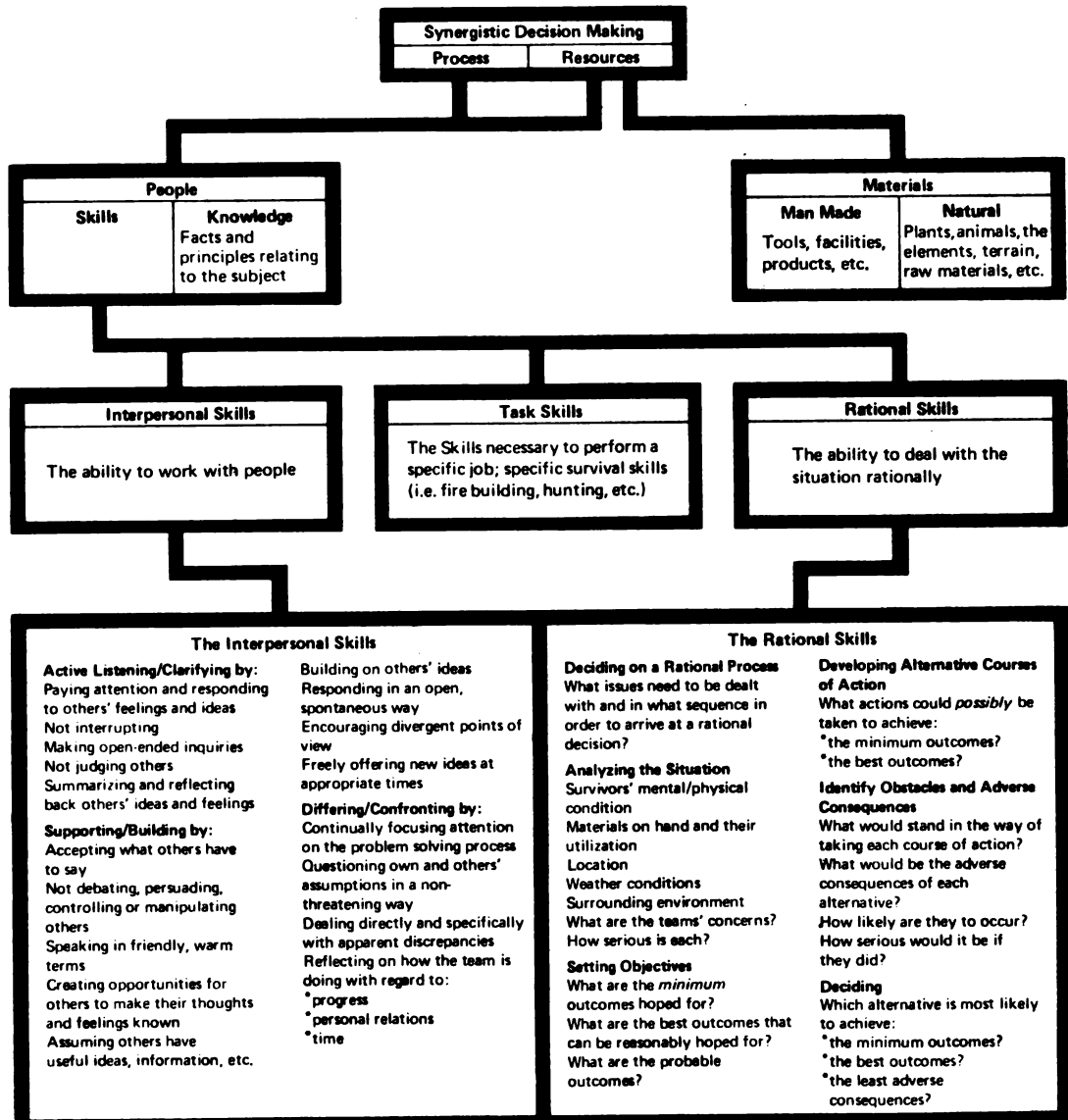
Step 2: After everyone has finished the individual ranking, rank order the 15 items as a team. Once discussion begins do not change your individual ranking.

Your team will have until _____ o'clock to complete this step.

ITEMS	Step 1 Your Individual Ranking	Step 2 The Team's Ranking	Step 3 Survival Expert's Ranking	Step 4 Difference Between Step 1 & Step 3	Step 5 Difference Between Step 2 & Step 3
flashlight (4 battery size)					
jack knife					
sectional air map of the area					
plastic raincoat (large size)					
magnetic compass					
compress kit with gauze					
.45 caliber pistol (loaded)					
parachute (red and white)					
bottle of salt tablets (1000 tablets)					
1 quart of water per person					
a book entitled, Edible Animals of the Desert					
a pair of sunglasses per person					
2 quarts of 180 proof Vodka					
1 top coat per person					
a cosmetic mirror					
			TOTALS (the lower the score the better)	Your Score Step 4	Team Score Step 5

Please complete the following steps
and insert the scores under your team's number.

	TEAM NUMBER					
	1	2	3	4	5	6
Step 6 AVERAGE INDIVIDUAL SCORE Add up all the individual scores (Step 4) on the team and divide by the number on the team.						
Step 7 TEAM SCORE						
Step 8 GAIN SCORE The difference between the team score and the Average Individual Score. If the team score is lower than Avg. Ind. Score then gain is "+". If team score is higher than Avg. Ind. Score then gain is "-".						
Step 9 LOWEST INDIVIDUAL SCORE on the team						
Step 10 NUMBER OF INDIVIDUAL SCORES lower than the team score.						

**Other materials published by ELM:**

Subarctic Survival Situation
 Project Planning Situation
 Management Styles
 Leadership and Motivation
 Learning Styles Inventory

Books by Alonzo W. Pond, M.A.

The Survival Book, Funk and Wagnalls, N.Y.
 Survival in Sun and Sand, Grosset and Dunlap, N.Y.
 Deserts, Grosset and Dunlap, N.Y.

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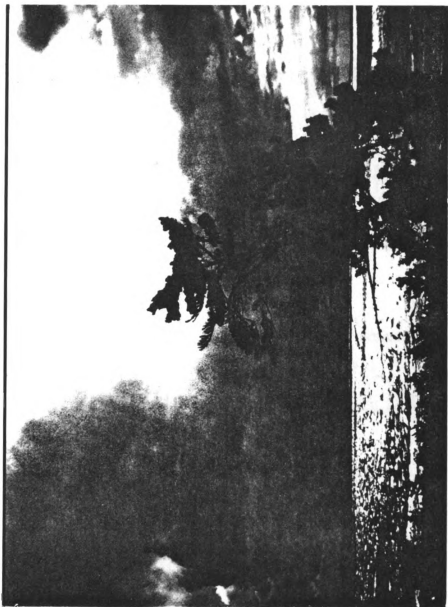
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The Subarctic Survival Situation

Developed by
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Director, Survival
of Human Synergistics

In consultation with the
men and officers of the
4th's Rescue Specialists
4th's Search and Rescue Squadron
Canadian Forces Base, Summerside
Prince Edward Island, Canada



The Situation

The situation described in this problem is a survival situation. It is a situation in which men and women lived or died depending on the survival decisions they made. Your "life" or "survival" depends upon how well your group can share in the problem, so that the group can make decisions which will lead to your survival.

The Situation

It is approximately 2:30 p.m., October 5th and the crash site is a small island in a float plane on the east shore of Lake Schellerville, in the region of the northern Quebec-Newfoundland border. The pilot was killed in the crash, but the plane was not destroyed. The plane was wet up to the waist and have perished heavily. Shortly after the crash, the plane drifted into the water and sank with the pilot's body pinned inside.

The pilot was unable to contact anyone before the crash. You are 30 miles south of your intended course and approximately 22 air miles from the nearest known habitation, destination, and the nearest known habitation. (The mining camp on Hollinger Lake was the building). Schellerville is a fire destroyed iron ore mining town approximately 300 air miles north of the St. Lawrence, 450 miles from the Gulf of St. Lawrence, and 800 miles south of the Arctic Circle, and 300 miles west of the Atlantic Coast. It is reachable by air from Schellerville, 190 air miles from town. Your party was escorted by a helicopter from northwestern Labrador to Schellerville. Notification Form with a copy of the Flight Transportation via Schellerville radio to that effect.

The immediate area is covered with small evergreen trees (1½ to 4 inches in diameter), and a few deciduous trees. The number of hills, rocky outcrops, and barren topography (the swamps) make up the valleys between the hills and consist only of small shrubs. Approximately 25% of the area in the region is covered

by long, narrow lakes which run northwest to southeast. Innumerable streams and rivers flow into and connect the lakes (see map).

Temperatures during October vary between 25° F and 36° F, although it will occasionally drop to as low as 0° F. Heavy clouds cover the sky, and the wind is strong with only one day in ten being fairly clear. Five to seven inches of snow are on the ground, and the wind is strong and blows frequently because the wind sweeps the exposed areas clear and builds drifts 3' to 5' deep in other areas. The wind speed averages 13-15 miles

Temperature Chart for Crash Area

	Mean Temp.	Mean Max. Temp.	Mean Min. Temp.	Minimum Daily Temp.	Maximum Daily Temp.
Oct. 1	30.3	35.9	24.9	0	0
Nov. 1	15	22.4	8.3	-33.0	0
Dec. 1	0.3	7.4	-8.1	-42.0	0
Jan. 1	-9.8	-1.5	-16.0	-53.0	0

Mean Snowfall

Oct. (Avg. 11 days of snowfall)	7.5 inches
Nov. (Avg. 16 days of snowfall)	14.5 inches

Windchill Factor

Wind Velocity MPH	Temperature °F
43	20
35	15
18	10
14	5
9	0
7	-10
6	-15
4	-25
3	-30
2	-40

Exposed Flesh will freeze at:

43	20
35	15
18	10
14	5
9	0
7	-10
6	-15
4	-25
3	-30
2	-40

Sunrise and Sunset

Sunrise	5:15 a.m.
Sunset	5:15 p.m.

per hour and is mostly out of the west-northwest.

You are all dressed in insulated underwear, sox, heavy wool shirts, pants, knit gloves, sheepskin jackets, knitted wool caps and heavy boots. Your personal possessions include: 1 rifle, 1 personal possession, 1 pocket knife (2 blades), 2 half dollars, 4 quarters, 2 dimes, 1 nickel and 3 new pennies; 1 pocket knife (2 blades), 1 half dollar, 1 quarter, 1 dime, 1 nickel, one stub lead pencil; and an air map (p. 2).

The Problem

Before the plane drifted away and sank, you were able to salvage the 15 items listed on pages 96-97. It is to rank these items according to "1" the most important, to "15" the least important.

You may assume:

1. the number of survivors is the same as the number of items listed;
2. you are the actual people in the situation;
3. the team has agreed to stick together;
4. all items are dry and in good condition.

Step 1:

Individually, without discussing the Situation with anyone, rank the items according to how important it is to your survival.

Step 2:

After everyone has finished the individual ranking, rank order the 15 items as a team.

You will have until _____ o'clock to complete this step.

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Third Edition, 1975

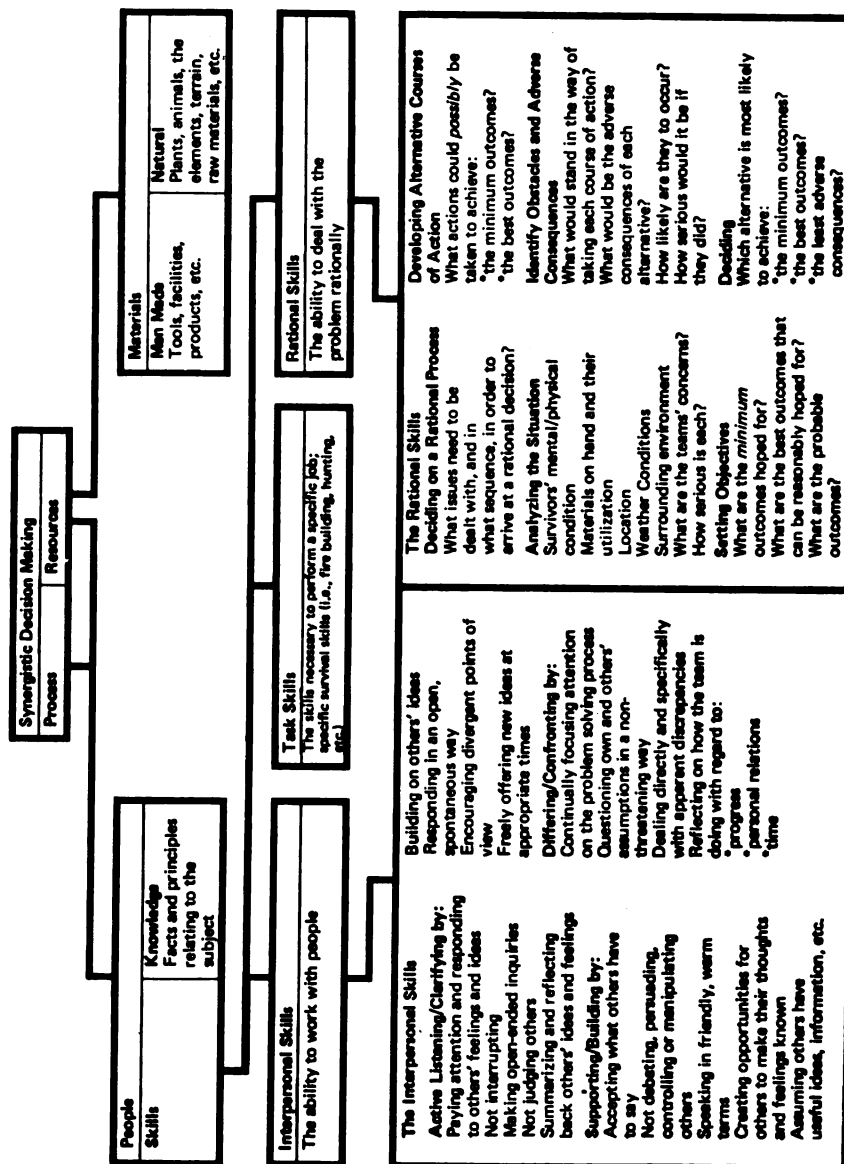
List of Items

Items	Step 1 Your Individual Ranking	Step 2 The Team Ranking	Step 3 Survival Experts' Ranking	Step 4 Difference Between Steps 1 & 3	Step 5 Difference Between Steps 2 & 3
A magnetic compass					
A gallon can of maple syrup					
A sleeping bag per person (arctic type down filled with liner)					
A bottle of water purification tablets					
A 20' x 20' piece of heavy duty canvas					
13 wood matches in a metal screwtop, waterproof container					
250 ft. of ¼ inch braided nylon rope, 50 lb. test					
An operating 4 battery flashlight					
3 pairs of snowshoes					
A fifth Bacardi rum (151 proof)					
Safety razor shaving kit with mirror					
A wind-up alarm clock					
A hand axe					
One aircraft inner tube for a 14 inch wheel (punctured)					
A book entitled, <i>Northern Star Navigation</i>					
Totals (the lower the score the better)					
				Individual Score Step 4	Team Score Step 5

Team Performance Data

	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Please complete the following steps and insert the scores under your team's number						
Step 6 Average Individual Score Add up all the individual scores (Step 4) on the team and divide by the number on the team.						
Step 7 Team Score (Step 6)						
Step 8 Gain Score The difference between the Team Score and the Average Individual Score. If the Team Score is lower than Average Individual Score, then Gain is "+". If Team Score is higher than Average Individual Score, then Gain is "-".						
Step 9 Lowest (Best) Score on the team.						
Step 10: Number of Individual Scores lower than the Team Score.						
Team Performance Data figures based on 2,173 participants (430 teams)	Average Individual Score (Step 6)	47.7%	Average Gain Score on Winning Teams	17.5%	On Winning Teams	3.4%
Average Ind. Score on Winning Teams	47.0%	Average Best Score on Team (Step 9)	25.5%	On Losing Teams	32.0%	
Average Ind. Score on Losing Teams	50.3%	Average Best Score on Winning Team	32.7%	Percent of Teams Having Scores Better Than Their Best Individual Score	58.7%	
Average Team Score (Step 7)	30.1%	Average Best Score on Losing Team	31.7%	Statistically within each group there is:		
Average Winning Team Score	21.4%	Percent of Individuals Having Scores Better Than Their Teams	35.9%	a highly significant (0.01) difference between these scores.		
Average Losing Team Score	41.1%		10.2%	a no significant difference between these scores.		

Synergistic Decision Making



About the Experts

While the Canadian Subarctic is beautiful, this wilderness, and its weather, is notorious as a people-killer. The Para Rescue Specialists for the 413 Transport and Rescue Squadron, in the eastern Canadian Subarctic, is responsible for finding and rescuing people lost in this area, on both land and sea in all weather conditions. The Para Rescue Specialists, especially Corporal John Clark, provided invaluable help in the construction of this Situation. They hope the people experiencing the simulated situation will be better prepared should they ever find themselves in a real survival situation. The Specialists point out, however, that one of the best preparations for your survival is to see to it that the plane you fly in is equipped with an automatic emergency locator transmitter. This beacon automatically transmits a signal, which can easily be followed by rescuers, when triggered by the impact of a crash. This is becoming mandatory flight equipment in both Canada and the U.S.

Clayton Lafferty and Patrick Eady, of Human Synergistics, are concerned primarily with the response to crisis, and with ways of helping people work together more effectively. The Survival Situation is intended to demonstrate that when people are supportive of one another and follow a rational sequence in dealing with their problems, they are able to perform beyond the sums of their individual resources or, in other words, the whole is greater than the sum of its parts. This is the meaning of "synergy," and the philosophy of Human Synergistics, a consulting firm dedicated to tapping the wealth of resources available in individuals, groups, and organizations.

Synergistic Decision Making

The algorithm on the preceding page illustrates the skills and resources involved in Synergistic Decision Making, a method of utilizing the human resources available in a group. The effectiveness of a given decision is determined by the results of the decision. The results are a product of the available resources and the process by which those resources are utilized. Resources consist of all the natural and manmade materials, as well as the people's knowledge and skills. The process, by which human and material resources are utilized, is the skills people employ in obtaining results. These skills are in three primary areas: *Interpersonal Skills* (the skills of working with others cooperatively); *Rational Skills* (the skills necessary for dealing with a situation with systematic creativity); and *Task Skills* (skills necessary for implementing a specific course of action). These are described more fully in the algorithm.

In crisis situations, such as a survival situation, the task skills are often lacking. Since a crisis is a new, sudden, unexpected set of circumstances, the people involved usually have not had time to develop the task skills necessary to deal with the crisis. Consequently, in a crisis like the one simulated in this Situation, it becomes even more critical than usual that people fully utilize their Rational and Interpersonal skills. When people are able to use these skills, they produce results which go beyond the sum of their individual efforts.

The Subarctic team performance data is an indication of the synergistic effect. The average individual score and the average best score for losing teams which are significantly

worse than the general average suggests that a lack of information is a prime reason for their poor performance (i.e., the relatively small average gain score). However, the average individual score and the average best score for winning teams is not significantly different from the average of all the 430 teams who have dealt with the Situation. Therefore, winning teams do better not because they have more information on the subject but because of the more effective way their teams reached their decisions.

Suggested Readings

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Other Materials Available From ELM

ELM, Experiential Learning Methods develops and publishes materials designed to demonstrate how experiential learning can be effectively and humanely utilized. The materials use a "discovery" method of training, allowing the group to discover the necessary information and skills to survive in a crisis situation, as part of their own human resources.

Managers and supervisors have found the use of the Survival and Planning experiences (see below) an effective method for initiating and improving the rational and interpersonal skills of their personnel.

Experiential Learning Methods also customizes materials to meet the specific training needs of a manager's unique training needs. For more information, contact Experiential Learning Methods.

Other materials currently available from ELM are listed below.

Survival Skills
A series of 14 experiential exercises for use by personnel in the reduction of the number and severity of accidents.

The first part of the series focuses on the consequences of accidents. Participants are asked to identify the causes of accidents and how they would take in responses to life-threatening situations such as, suffocation, electrocution, severe bleeding, and poisoning. These, as well as, a series of 14 experiential exercises on how to respond to an injury are included. The exercises have a maximum impact on the participant. The situations and the alternatives for dealing with the situations are pictorial (flashcards or photographs) so that poor or non-readers can use them.

The subsequent 8 experiences focus on the causes of accidents and are all work place oriented. The experiences involve such

things as who gets hurt in terms of type of job and experience, which parts of the body are most often hurt, what hazardous conditions are most hazardous to participants, the most hazardous part of your job, and the art of lifting.

The 14 experiences, constituting a year of safety training, each take from 20-60 minutes to complete depending on the skills of the leader and the participants.

The Desert Survival Situation
Similar in purpose and format to the Subarctic Survival Skills and Desert Survival Skills, this instrument has much less situational complexity to deal with. Participants, through their own experience, demonstrate the advantages of teamwork over individuals in problem solving. The exercises are designed to develop rational task skills and interpersonal skills in decision making. It can be used as a pre or post test measure of team effectiveness.

The Project Planning Situation
Participants, individually and/or on a team basis, must rank order fourteen managerial activities according to the sequence they would follow in managing a project. The activities include the entire range of management functions, such as situation analysis, objectives setting, budgeting, organizing, selecting, evaluating, and controlling. The project is a joint man/rope objective setting, coordinating, and performance review. The Problem focuses attention on the nature of management and the importance of discussion into the entire area of management skills.

The process highlights the advantages of teamwork in planning (31% of the teams do better than their best team member) and illustrates the importance of positive interpersonal relationships in team decision-making skills in decision making. The Problem can be used as an individual and/or team test of

planning skill which pinpoints deficiencies. This Problem can be used as a natural follow-up activity to the Survival Problems.

The Learning Styles Inventory
Experienced and concerned educators have been aware that people differ in the way they learn. Research is beginning to confirm the existence of these differences, and to recognize that not all students are equally intelligent. They are customarily measured. Certain personality or attitudinal values affect the teaching-learning process. The Learning Styles Inventory has been developed to measure some of these values which seem to affect learning, and which contribute to satisfactory and effective learning in the teaching-learning situation. The major categories measured are: Content, Content, Mode, and Expectations.

The Inventory can be used in schools, or in training situations in business, government, industry, etc. The instrument can be completed in 10-15 minutes and requires only a pen and a raw score profile takes about 10 minutes.

Leadership and Motivation
This instrument, developed by Dr. Lafferty, explores the impact of management on the defensive force on the individual. Dr. Lafferty discusses the defensive reactions that occur as a result of management. By Anxiety (MBA), a widespread management problem, and the ways of combating the destructive aspect of defensiveness, fear of failure, self-selective perception, and the way people maintain self-defeating behavior.

Materials may be ordered from:
EXPERIENTIAL LEARNING METHODS
3601 E. 10th Avenue
Plymouth, Michigan 48170
313-469-1040

APPENDIX B

Research Questionnaire

Factor Intercorrelations and Loading
Matrix - Communality in the Diagonal

1. To what extent did the leader try to influence the decisions made by the group?

Very Great Extent	Great Extent	Some Extent	Little Extent	Very Little Extent	To No Extent
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2. To what extent did the leader encourage communication among all members of the group?

Very Great Extent	Great Extent	Some Extent	Little Extent	Very Little Extent	To No Extent
-------------------------	-----------------	----------------	------------------	--------------------------	-----------------

3. To what extent was the leader considerate of the feelings of other group members?

Very Great Extent	Great Extent	Some Extent	Little Extent	Very Little Extent	To No Extent
-------------------------	-----------------	----------------	------------------	--------------------------	-----------------

4. To what extent did the leader stimulate members of the group to make contributions to the solution?

To No Extent	Very Little Extent	Little Extent	Some Extent	Great Extent	Very Great Extent
-----------------	--------------------------	------------------	----------------	-----------------	-------------------------

5. To what extent did the leader ask for suggestions from the group?

Very Great Extent	Great Extent	Some Extent	Little Extent	Very Little Extent	To No Extent
-------------------------	-----------------	----------------	------------------	--------------------------	-----------------

6. To what extent did the leader use the suggestions of other members of the group in attempting to reach a solution to the problem?

To No	Very	Little	Some	Great	Very
Extent	Little	Extent	Extent	Extent	Great
	Extent				Extent

7. To what extent did the group, excluding the leader, actually derive the solution?

To No	Very	Little	Some	Great	Very
Extent	Little	Extent	Extent	Extent	Great
	Extent				Extent

8. There was much disagreement among members of the group.

Strongly	Disagree	Slightly	Neither	Slightly	Agree	Strongly
Disagree		Disagree	Agree nor	Agree		Agree
			Disagree			

9. In both problem-solving sessions my opinion was given adequate consideration by the other members of the group.

Strongly	Disagree	Slightly	Neither	Slightly	Agree	Strongly
Disagree		Disagree	Agree nor	Agree		Agree
			Disagree			

10. I was quite satisfied with being a member of this group.

Strongly	Agree	Slightly	Neither	Slightly	Disagree	Strongly
Agree		Agree	Agree nor	Disagree		Disagree
			Disagree			

11. On the whole I was satisfied with my group's performance.

Strongly	Disagree	Slightly	Neither	Slightly	Agree	Strongly
Disagree		Disagree	Agree nor	Agree		Agree
			Disagree			

12. I felt inhibited from expressing my feelings during the group discussion.

Strongly Agree	Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Disagree	Strongly Disagree

13. I had considerable influence in determining my group's final solution to the tasks.

Strongly Agree	Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Disagree	Strongly Disagree

14. I felt a real sense of involvement with the group.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree

15. If I were taking part in another experiment, I would like working with these same people.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree

16. Rather than working as one unified group, it seemed the group worked in sub-groups or as individuals on the problems.

Strongly Agree	Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Disagree	Strongly Disagree

17. The group had a great deal of influence on my final ideas about what would be a good solution.

Strongly	Disagree	Slightly	Neither	Slightly	Agree	Strongly
Disagree		Disagree	Agree nor	Agree		Agree
			Disagree			

18. I cared about whether or not my group attained good solutions to the problems.

Strongly	Disagree	Slightly	Neither	Slightly	Agree	Strongly
Disagree		Disagree	Agree nor	Agree		Agree
			Disagree			

19. I contributed a great deal to help my group attain good solutions to the problems.

Strongly	Agree	Slightly	Neither	Slightly	Disagree	Strongly
Agree		Agree	Agree nor	Disagree		Disagree
			Disagree			

20. I tried, to the best of my ability, to help the group attain good solutions to the problems.

Strongly	Agree	Slightly	Neither	Slightly	Disagree	Strongly
Agree		Agree	Agree nor	Disagree		Disagree
			Disagree			

21. I tried to make my opinions known during the problem-solving sessions.

Strongly	Agree	Slightly	Neither	Slightly	Disagree	Strongly
Agree		Agree	Agree nor	Disagree		Disagree
			Disagree			

22. I would be willing to participate in similar problem-solving sessions.

Yes _____ No _____

23. This group was well organized for the tasks we were to perform.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
----------------------	----------	----------------------	----------------------------------	-------------------	-------	-------------------

24. I think my group developed high quality solutions to these tasks.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
----------------------	----------	----------------------	----------------------------------	-------------------	-------	-------------------

25. My group was an effective problem-solving team.

Strongly Agree	Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Disagree	Strongly Disagree
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26. My group would be capable of solving similar problems.

Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
----------------------	----------	----------------------	----------------------------------	-------------------	-------	-------------------

27. My group would be capable of solving different problems.

Strongly Agree	Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Disagree	Strongly Disagree
-------------------	-------	-------------------	----------------------------------	----------------------	----------	----------------------

Please rank the members of your group, excluding your leader but including yourself, from 1 (most competent) to 4 (least competent) on the following items:

28. Keeps group working on task at hand

1. _____

2. _____

3. _____

29. Provides best ideas

1. _____
2. _____
3. _____
4. _____

30. Does the most to keep the group functioning as a smooth unit

1. _____
2. _____
3. _____
4. _____

31. Best able to integrate information

1. _____
2. _____
3. _____
4. _____

32. Makes others feel he understands them

1. _____
2. _____
3. _____
4. _____

33. Is most cooperative

1. _____
2. _____
3. _____
4. _____

34. As you know this study involves a large number of people, participating in a group. Some students have not been at all happy with their group. They have asked to be changed to another group, for future sessions, where they might get along better with other group members. In these situations we will accomodate them. What we'd like to know now is, since there are other group situations available as a result of these changes:

1) Would you like to change your group for future sessions:

Yes _____ No _____

2) If you would like to change your group, which of the members of your current group would you like to be with?

1. _____

2. _____

3. _____

4. _____

FACTOR INTERCORRELATIONS AND LOADING MATRIX¹

Item number	9	10	11	12	13	14	15	16	17	18	19	20	21	23	24	25	26	27	SAT	COH	COM	P-S	
	9	45																					
	10	56	73																				
	11	55	71	67																			
	12	54	70	66	66																		
	13	62	54	58	52	41																	
	14	52	42	46	44	65	47																
	15	36	55	53	47	39	45	53															
	16	44	50	54	37	32	27	34	24														
	17	02	28	45	09	06	13	38	22	10													
	18	28	22	34	28	27	32	21	07	20	07												
	19	70	52	45	51	65	53	40	34	01	13	25											
	20	46	62	57	54	37	36	40	29	31	30	47	95										
	21	53	36	38	43	35	39	10	22	13	14	35	74	50									
	23	52	43	43	29	38	48	41	44	19	36	47	31	32	39								
	24	23	43	51	35	23	33	40	24	35	26	27	63	43	45	48							
	25	50	52	62	32	44	34	41	32	32	21	48	47	30	49	44	49						
	26	26	36	48	25	22	33	41	36	47	23	19	50	36	35	69	36	49					
	27	39	38	40	24	43	34	48	26	30	11	49	24	16	40	26	56	45	38				
	SAT	67	85	82	81	71	58	60	59	27	35	69	70	54	53	48	62	43	44	100			
	COH	68	80	89	66	64	69	73	49	31	38	67	60	41	66	54	64	62	63	96	100		
	COM	80	70	71	72	67	65	45	38	27	26	49	100	71	60	64	59	52	41	93	84	100	
	P-S	57	64	73	43	51	55	63	48	49	35	57	64	47	63	60	70	70	61	75	93	83	100

¹Communality in Diagonal

APPENDIX C

Examples of Step-down F-ratios with Various Orderings

EXAMPLES OF STEP-DOWN F-RATIOS

<u>Variable</u>	<u>Step-down F</u>	<u>P less than</u>
Cohesivensss	16.08	.0013
Satisfaction	.26	.6185
Commitment	1.78	.2070
Problem Solving	.42	.5290
Problem Solving	5.52	.0340
Satisfaction	6.35	.0256
Commitment	1.80	.2046
Cohesiveness	1.04	.3285
Commitment	8.71	.0106
Problem Solving	.15	.7036
Satisfaction	5.45	.0378
Cohesiveness	1.04	.3285
Satisfaction	14.86	.0018
Commitment	2.00	.1805
Cohesivensss	.69	.4216
Problem Solving	.42	.5290

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