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ADMINISTRATIVE PROBLEM SOLVING BEHAVIOR AND THE ORGANIZATIONAL CLIMATE

John P. Campbell

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University of Minnesota

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13. ABSTRACT

The primary aims of the research were to: (1) Sample the problem solving content of administrative jobs and develop a taxonomic classification of such content; (2) investigate how problem solving activity varies with situational variables such as hierarchical level, functional area, and organizational climate; (3) use the problem solving taxonomy to guide the construction of prototype simulations of administrative problem solving; (4) build a generalized measure of organizational climate; (5) determine the organizational correlates of differences in superior vs. subordinate perceptions of organizational climate; and, (6) begin a series of studies aimed at describing the processes by which the nature of the problem and the organizational climate affect problem solving and decision making behavior.

Previous research is reviewed in the areas of managerial behavior description, the types of variables used in experimental research, the criteria used to evaluate the effects of management development programs, previous attempts to assess situational determinants of behavior (particularly organizational climate), previous research dealing with the effects of climate on behavior, and previous efforts to study problem solving and decision making processes.

Given the above objectives and the current state of the art in each of these domains, the following studies were carried out.

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13. ABSTRACT (continued)

A. The problem solving content of managerial types jobs was sampled by asking a stratified sample of managers and administrators to describe what they did via a lengthy in depth interview and by keeping a diary. The individual problem descriptions were used to develop and retranslate a taxonomy of managerial and administrative problem solving.

B. Two studies were carried out for the purposes of developing a measure of organizational climate and relating it to measures of work group and managerial performance. An 85 item questionnaire measure of both work group and organizational climate was developed and considerable effort was devoted to determining its dimensional properties. Subscales for both work group and total organization climate were developed and significant correlations were found between specific scale scores and performance.

C. A series of studies designed to investigate the decision making and problem solving process was begun. The general procedure was to develop a simulated decision making situation based on the previous taxonomy and structure the specific informational content according to the parameters deemed important by alternative decision making theories. Information was then presented sequentially to the decision maker to determine the relative strength with which different kinds of information affect decision behavior.

14. KEY WORDS	LINK A ROLE	LINK A WT	LINK B ROLE	LINK B WT	LINK C ROLE	LINK C WT
Managerial problem solving						
Managerial behavior description						
Organizational climate						
Decision making processes						

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PURPOSE

As originally stated, the specific objectives of this program of research were as follows.

1. To sample systematically the "problem solving" content of managerial and administrative positions and to construct a taxonomic classification of this problem solving content. Currently, very little data exist concerning what managers and administrators actually do. As a result, both practice and research regarding the identification and development of administrative talent suffers from a lack of guidance relative to crucial dependent variables.
2. To determine how the problem content of managerial and administrative jobs covaries with certain organizational variables such as hierarchical level, functional area, and perceived "climate."
3. To compare how the problem content of an incumbent's job is perceived by superiors, subordinates, and peers.
4. To construct prototypes of standardized "problem" situations or exercises representing selected parts of the previously developed taxonomy.

The research activities of the first year suggested additional objectives that became linked with the original set. These were as follows.

A. To build a broad guage instrument for measuring organizational climate such that the instrument is suitable for use in a wide variety of organizations.
B. To determine the organizational correlates of differences in superior vs. subordinate perceptions of organizational climate and differences in superior vs. subordinate perceptions of the subordinate's job problems.
C. To begin a series of studies for the purpose of describing the effects of differing problem content and differing organizational climate on problem solving and decision making behavior.

The previous literature which has direct relevance for both the original and subsequent objectives is discussed below under 5 major headings. It is the intent of the discussion to build a case for the necessity of understanding the problem solving and decision making behavior of leaders and administrators together with the situational variables that influence it. Also, we would like to identify methodological approaches that may be relevant for the proposed research.

BACKGROUND

We should mention one possible source of confusion for the reader. Two principal kinds of problem solving activity will be discussed. One of these is the problem solving activity in which managers and administrators actually engage while performing their job. The other is performance on test problems

or "simulated" exercises such as might be used as dependent variables in experimental work. The construction of these simulations should be guided by the actual sampling of the problem solving content of the job. The research summarized here deals with both.

1. Previous Behavior Description of Managerial Jobs

A certain amount of previous research data does exist concerning what managers and administrators do; but as noted by Campbell, Dunnette, Lawler, and Weick (1970), the surface has only been scratched and most investigators have not tried to describe systematically the dimensions along which behaviors differ or to determine the organizational and behavioral correlates of these differences.

One type of research effort is represented by Carlson's (1951) study of the job activities of ten European executives. Secretaries, personal assistants, telephone operators, and the executives themselves were trained in observation techniques and were instructed to record every action taken by the ten subjects over a four week period. Carlson concluded that the subjects worked excessive hours, spent too much time outside the firm, did too little planning, and had insufficient time for supervising operations. Thus, a mass of observational material describing activities was collected but little attention was devoted to developing reliable and meaningful behavior categories that would be useful in further research. Similar studies were carried out by Dubin and Spray (1964), Kelly (1964), and O'Neill and Kubany (1959). The major conclusions from these studies were simply that administrative behavior is very, very complex. Their results did not seem to point to further research or action.

In contrast to comprehensive observation of job activities, a few investigators have tried to describe administrative jobs in terms of their critical requirements (Flanagan, 1954). Kay (1959) collected 691 critical incidents from managers and employees in a single firm. Williams (1956) gathered over 3500 incidents from a sample of 742 executives, and Andersson and Nilsson (1964) obtained 1847 critical behaviors relative to the job of grocery store manager. Surprisingly few attempts have subsequently been made to derive critical behavior categories and assess their correlates. Most often the classifications have been stated in terms of performance or criterion dimensions.

Another class of studies aimed at describing administrative positions has relied on factor analytic analysis of questionnaire data as a methodological approach. Studies by Fleishman (1953), Grant (1955), Prien (1963), and Stogdill and Coons (1956) are illustrative. In general, these studies point toward the existence of two general dimensions making up managerial and administrative behavior. The Ohio State group has labeled these Consideration and Initiating Structure; Prien calls them Job Orientation and Employee Centeredness; and others (e.g. Blake and Mouton, 1968) have referred to them as "Concern for production" versus "Concern for employees." However, based on an examination of the questionnaire data making up the factors, they actually appear to constitute more of the attitudinal properties of an individual rather than his actual behavior. In addition, few studies have demonstrated any relationship between this kind of self descriptive content and job performance or job behavior (Korman, 1966).

Perhaps the best dimensional study of administrative jobs is the one by Hemphill (1960). He developed the Executive Position Description Questionnaire (EPDQ) which was originally composed of 575 job elements. An individual rates each element according to how much it is a part of his job. Based on responses from 93 executives, Hemphill factor analyzed the between people correlations (rather than between items) and obtained 19 "clusters" of positions (e.g. Providing a staff service in non-operational areas; Supervision of work; Internal business control; Long range planning; Preservation of assets, etc.). Thus, each factor is described directly in terms of the types of managers that comprise it and only indirectly in terms of specific behaviors.

Unfortunately few attempts have been made to build on the work of Hemphill or any of the others. No one has tried to refine, extend, or validate their dimensions and few attempts have been made to determine their correlates. In their review of the literature relative to level differences in administrative functions, Fiedler and Nealey (1966) located only six studies and over half of these dealt with fewer than 10 subjects and only two hierarchical levels. We could find no studies which attempted to relate behavior differences to any other variables besides organizational level. Many interesting questions concerning the relationship of differences in behavior content to variations in organizational climate, task demands, role conflict, and the abilities and interests of the incumbents remain unanswered.

In summary, previous research concerning what managers and administrators do is sparse and not very systematic. Also, it is primarily concerned with describing activities or attitudinal components and has not been concerned with variation in actual problem solving or decision making behavior.

2. The Problem of the Problem

Given the lack of data concerning the problem solving activities of managers and administrators, it is not surprising that there would be very little connection between organizational problem solving and the dependent variables used in experiments. This is in spite of the obvious importance of the characteristics of the task for the behavior of individuals, small groups, and organizations. For example, Sells (1964) in his attempt to develop a taxonomy of organizations places a great deal of emphasis on the characteristics of the task or problem as determinants of organizational behavior. In the area of small group research, Hoffman (1965) points out that the type of problem faced by the group is probably one of the most significant variables associated with differences among groups but it has received almost no attention.

Of course this "problem of the problem" has been frequently pointed out (Lorge, Fox, Davitz, and Brenner, 1958; Duncan, 1959; Kelly and Thibaut, 1958). The problems used in experimental settings have often consisted of puzzles, parlor games, or manipulative tasks (e.g. rearranging match sticks, transporting incompatible people across a river in a small boat, or constructing buildings from playing cards) that require a "eureka" or sudden insight type of solution. It is difficult to feel confident about the usefulness of these kinds of tasks for eliciting generalizable problem solving behavior on the part of the

participants. At the other extreme complex "opinion" problems have been used, such as whether or not the present grading system in universities should be abolished or what an individual should do if he observes another employee stealing from the firm. Problems such as these are not appropriate if the quality of the solution is a consideration because they obviously have no correct answers, and judgments about solution quality are difficult to make. Also, their degree of relevance for much of organizational problem solving behavior is difficult to judge. That is, debate on moral or social issues may or may not be closely related to many of the problem solving activities of people in organizations. Perhaps more relevant are the human relations problems utilized by N. R. F Maier and his associates (Maier, 1963), but these still present difficulties in the evaluation of solutions, and they represent only one type of problem content. The complex business game offers another possibility; but as has been pointed out by Bass (1964) and Campbell et al. (1970), very little has been done with business games in a research setting.

Although in the minority, a few examples of more complex test problems have appeared in the recent literature. The human relations problems of N. R. F. Maier are one example, but their content is restricted to the so called human problems of supervision. Bass (1964) has strongly advocated an increased use of business games in problem solving research and training evaluation research and reports a study using the Production Organization Exercise (POE) which involves building and marketing products made from IBM cards. However, few other investigators have tried to use business games as research instruments. One exception is an unpublished study by Teich (1964) which utilized a modified business game. The study showed a significant relationship between individual supervisors' scores on the game and ratings of job performance. Similar to a business game is the tinker toy manufacturing problem used by Pepinsky, Hemphill, and Shevitz (1958). With this problem the participants have to buy raw material, manufacture finished products out of the tinker toys, and sell them to the experimenter. Along this same line is the word marketing problem developed by Ackoff (Clark and Ackoff, 1959). The object here is to buy vowels and consonants as raw materials and use them to build words which can be marketed. Both these latter problems seem to incorporate a great deal of complexity, but there is the possible danger of their being viewed as "games" instead of legitimate tasks. Also promising are the "in-basket" problems (Frederiksen,1966b; Frederiksen, Saunders, and Wand, 1957; Lopez, 1966) which present the participant with an in-basket containing a number of problems requiring a solution. The in-basket has also been used rather infrequently in research and then largely in the assessment of individual managerial skill.

One predominant characteristic of these more complex problems or simulations is that they have been developed independently of any taxonomic guideline as to what exists in the real world. For the most part, they are derived from considerations of interest and feasibility and a subjective consideration of what is important. An exception is the business game which is often constructed on the basis of formal economic theory. Neither approach has any "built in" relevance to what managers and administrators actually do.

In Gagne's classic formulation of the appropriate learning model for organizational training and development (Gagne, 1962), he placed considerable stress on the necessity for specifying "what is to be learned." Once the desired behaviors are

specified, attention should be given to what training experiences will best "mediate" the desired behaviors. This formulation says that if we want to develop training programs for managers and administrators we must first describe the things we want managers to do and then develop training content that will best facilitate learning these desired skills. In their exhaustive and exhausting review of management training and development programs, Campbell et al. (1970) could find no instance of where this formulation was followed. Here again, the lack of a taxonomic description of relevant management behavior blocks the effective specification of training content.

3. The Manager or Administrator as a Problem Solver and Decision Maker

An important behavior under consideration in the current research is problem solving and decision making. For some writers the term manager is almost synonymous with that of problem solver or decision maker. Interest in problem solving and decision making has tended to be channeled along at least three different lines of inquiry. One of these is training and development. A great deal of organizational effort is expended toward teaching managers and administrators to become better problem solvers (Campbell et al., 1970) and a certain amount of research has been devoted to evaluating the results of these training programs. Thus, a set of organizationally critical questions revolve around what sorts of problem solving behavior should be the focus of a learning or development program and how the effects of the development program (an experimental treatment) should be determined. A second channel has to do with the efforts to investigate individual and group problem solving strategies and the important parameters that influence them (see for example: Davis, 1966; Hoffman, 1965; Kelly & Thibaut, 1958). The third focuses on theory and research in individual decision making processes and is primarily devoted to exploring the utility of various theoretical models of the decision making process (e.g. Cyert, Simon, & Trow, 1956; March & Simon, 1958; Taylor, 1965).

In all of these areas, investigation has been hampered by a lack of knowledge concerning the job relevance of the dependent variable. That is, the criteria used to evaluate the effects of learning programs or determine the effects of experimental manipulation in the laboratory setting have not been derived in any direct way from the actual problem solving activity of people in organizations. Thus we have no systematic means for investigating how variations in task demands can influence conclusions concerning the effects of a particular training technique or the results of a problem solving strategy.

a. Measures of training effectiveness and the content of development programs. The empirical research concerning the effectiveness of management training and development has been summarized in the Campbell et al. (1970) volume. A total of 65 studies were cited and the criteria employed were divided into two categories, internal and external. The distinction is credited to Martin (1957). External criteria are those which reflect changes in performance effectiveness in the actual job situation such as unit turnover, sales volume, ratings by superiors, and the like. Supposedly, they are interpretable in relation to either the explicit or implicit goals of the organization. Internal criteria, on the other hand, are interpretable in terms of the more immediate behavioral goals of the training program. Indices such as attitude and opinion measures, achievement

tests, trainee ratings, and performance in simulated problems fall in this category. Internal criteria are set up to reflect what is learned in the training program, but there is no direct link between this kind of criterion and actual job behavior. A drastic increase in "employee centered" attitudes or a brilliant performance on a standardized case problem at the conclusion of the training program may or may not mean an actual change in job performance.

Of the 65 studies cited by Campbell et al., 13 were classified as employing predominantly external criteria while 52 relied largely on internal criteria. The bulk of the latter were attitude and opinion measures of paper and pencil achievement tests. Only three, Castle (1952), DiVesta (1954), and Maier (1953), used standardized problem situations, and all three of these were human relations role playing situations. The training programs were of the conference type, and the results were generally favorable.

The implication is not that one or the other of these two classes of criteria is more important. For a full understanding of training effects, both types of criteria must be used. The relationship between the two is the essence of the transfer problem. Gagne (1962) pointed out that in order for training to be effective, the variables which "mediate" performance must be identified and brought under the control of the learning situation. Measures of these mediating variables (e.g. interpersonal sensitivity, human relations skill, financial expertise, decision making skill, sales forecasting ability) are synonymous with internal criteria as the term is being used here. The necessity for developing adequate measures of such variables and determining their relationship to actual behavior on the job is obvious.

b. The investigation of problem solving. As has been argued above, research on complex problem solving in adult populations has suffered because of a lack of meaningful experimental tasks. Just to illustrate the point, we might consider one of the most viable such research topics relative to management and administration, the question of whether groups are better problem solvers than individuals. The earlier history of research on the topic seemed to suggest that groups were superior (Collins & Guetzkow, 1964; Lorge, Fox, Davitz, & Brenner, 1958; Thorndike, 1938; Timmons, 1942; and Watson, 1928). However, several of these earlier studies incorporated certain methodological flaws (Faust, 1959). For example, the average group score on the experimental task was often compared to the average individual score; and as a result, each individual had to compete against the several people making up the group. More recent studies (Bouchard, 1969; Campbell, 1968; Dunnette, Campbell, & Jaastad, 1963; Taylor, Berry, & Block, 1958; and Tuckman & Lorge, 1962) have employed the "nominal" vs. "real" group comparisons. That is, the problem solving efforts of a number of individuals working alone are combined in some fashion by an independent party, and this nominal group score is compared to the score of a like number of individuals interacting as a real group. In the five studies cited above, the nominal groups were significantly superior to the real groups; however, the test problems used were of rather specialized varieties. Tuckman and Lorge employed the Mined Road Problem while the Bouchard, Dunnette et al., and Taylor et al., studies used a brainstorming format and problems such as, "How could we get more European tourists to the United States?" In contrast, a study by Faust (1959) utilized a nominal group comparison and the real group proved superior on spatial relations problems; but there was no difference on anagram

problems. The suggestion is that the superiority of either the individual or group strategy may be a function of the type of task. A similar conclusion was reached by Comrey (1953) and Comrey and Staats (1955) who found that with a motor task a surprisingly small proportion of the variance of team performance could be predicted from knowledge of individual proficiency while the opposite tended to be true for a cognitive task. Additional interactive effects are suggested by the results of studies carried out by Hall, Mouton, and Blake (1963), and Fox and Lorge (1962). In the former study, the difference between individual and group performance seemed to be partially a function of task complexity while in the latter, it was found the groups seemed to benefit more from additional time than did individuals.

As has been pointed out by Vroom (1968), the evidence concerning the individual vs. group strategy is equivocal. A number of very crucial interactive effects remain to be explored and the test problems used have not been such to guarantee fruitful generalization to the organizational setting. The distinction is posed by Maier and Hoffman (1962) between focusing on the quality of solutions vs. the commitment of the individuals to the implementation of the solution must also be kept in mind. One might wish that such studies could be repeated on tasks representing a better sampling of problem content. Simulated problems tied directly to organizational behavior would greatly facilitate the generalization of experimental research results.

c. Previous theory and research in decision making processes. For purposes of this section, human decision making behavior is defined simply as the choice among alternative courses of action when the state of criterion definition and measurement does not allow the choice to be optimally specified by an algorithm or objective set of rules. Since it is difficult to make a useful distinction between problem solving and decision making on logical grounds, they are talked about separately here only because they appear under separate labels in the literature.

At present there exists a number of models or theories purporting to describe what the decision making process is like. Most of these can be grouped under five major labels:

A. Classic economic man
B. The subjective expected utility model
C. The March & Simon Administrative Man Model
D. The Skinnerian model
E. The incremental or anarchist model

Most of these models make use of some form of the picture shown in Figure 1. It says that a decision maker is faced with a number of alternative actions. Each action, if pursued, will lead to a certain set of outcomes (here labeled O_i). For example, alternative means of mass transit are associated with different

outcomes such as whether or not people will actually use it, the cost, what kinds of people it would benefit most, relative efficiency, etc. In like manner, an undergraduate trying to choose a graduate school is faced with certain outcomes flowing from each choice (large classes, hi caliber student body, large stipend, etc.). Each outcome has a value to the decision maker. An economist calls this value utility, a social psychologist might use the term valence. The important point is that these assignments of utility are value judgments. Even though a prospective graduate student knows the stipend will be exactly $3,000 (tax free) he must still decide what that's worth to him personally. Values can be positive or negative. Besides taking on a particular value, each outcome is also characterized by the probability that it will indeed occur if a specific alternative is chosen. These probabilities (even if we don't know them very precisely) are matters of fact rather than personal preference.

The total worth, or total utility, of a particular alternative is then some function of the individual utilities of the outcomes associated with it and the probability that each of these outcomes will occur. Different models have proposed different methods for combining these individual variables into total utility and they constitute one of the major distinctions among theories. Other distinctions revolve around how value and probability estimates are made and how alternatives are compared, once their utility has been determined.

Classic Economic Man

The traditional view of the decision maker comes from the economists in the form of variations on the theme of classic economic man. Early classic decision theory had the following ingredients (Taylor, 1965).

1. The probabilities of all outcomes, given an alternative selection, were assumed to be 1.0 (i.e. decision making under certainty).
2. Information about available alternatives and the outcomes associated with them is complete. That is, the theory assumed we had all the information we needed.
3. Outcomes can be at least ordered on a utility continuum. A cardinal (ratio) scale is not really necessary but the utility continuum is assumed to be continuous such that two different outcomes can always be distinguished. That is, the individual is infinitely sensitive.
4. That alternatives are selected which maximize utility for the decision maker.

In this form, the classic model was used to derive some rather basic dicta of how a profit seeking organization should behave. In a very macro sense the theory has worked and some predictions can be made about what various sectors of the economy will do, faced with certain factors such as investment credits, tax incentive, and the like. However, for a single organization or individual it's another matter. The assumptions are questionable and the model as a descriptor of individual behavior has been pretty well demolished (Simon, 1957).

The Subjective Expected Utility Model (SEU)

Later developments took up the case of so called "risky" decisions where the probability of an outcome given an alternative is not 1.0, but something less, and may or may not be known. In this form, it is referred to as the subjective

expected utility model (e.g. see Edwards, 1954). This model predicts that individuals will attempt to maximize their subjective expected utility where the SEU of any particular alternative is equal to the cross products of individual outcome utilities perceived by the individual and the perceived probability of their occurrence, summed across outcomes. For example, this says that the decision to pollute is taken because the decision maker has estimated that the positive outcome values outweigh the negative outcome values and/or the probabilities are low that negative outcomes will occur. Notice that something more than an ordinal scale for utility was reintroduced. That is, if people are going to be making this multiplication and summation in their heads, they have to be able to judge outcome utilities on something more than an ordinal scale.

The March & Simon Administrative Man Model

Certain management theorists (e.g. March & Simon, 1958) have combined the basic SEU model notions with some assumptions about the nature of the actual decisions that must be faced in the real world. Flowing from administrative man and contrary to the assumptions of the classic theory:

1. Alternatives are frequently not available and must be created.
2. Information concerning outcomes is very incomplete and must be searched for.
3. Search is costly.
4. Information is ambiguous, which leads to uncertainty as to the expected value of specific outcomes.

Administrative man tends to deal with the cost and uncertainty of information in the following ways.

Uncertainty is reduced by:

1. Concentrating on outcomes whose expected value can be expressed in quantitative or quasi-quantitative terms. It's no fun to wrestle with outcomes that cannot be readily quantified on some familiar scale--best that we avoid it. Although the decision maker must in the end judge the outcome's value to him, it's easier to do that for such things as the number of jobs created or the size of the tax base than for quality of life and clarity of water.
2. Dealing with outcomes which can be evaluated in the short run. Other things being equal, the closer the outcome to the time the alternative is selected, the less the uncertainty concerning probability and utility estimates. Dirty air right now seems worth more attention than a ruined ocean decades from now.

The costs associated with gathering information and evaluating outcomes are reduced by:

1. Keeping computations and information simple. Decision makers tend to avoid elaborate research projects or highly complex information systems
2. Satisficing not maximizing. That is, the decision maker will create alternatives and gather information until he finds an alternative that is satisfactory rather than optimal. This implies that the decision maker has a stereotype of what a satisfactory alternative should look like and once he finds it he will quit searching. Satisficing is not

unlike the social psychologist's concept of aspiration level and is meant to obey the same laws. For example, if a decision maker finds it easy to satisfice he most likely raises his standard for what he considers to be satisfactory, and vice versa.

In sum, administrative man is governed by his perceived expectancies concerning what will happen in the future but he lives in a world that is much too complex to know completely. As a result he satisfices rather than maximizes and gravitates toward outcomes that can be thought about in terms of some familiar quantitative scale and which will become manifest over the relatively short run.

The Skinnerian Model

The administrative model is a cognitive one. That is, it looks inside the decision maker's head and asks how he thinks about things. It assumes that people have expectations about the consequences of their actions or choices and that these expectancies help govern their behavior. The Skinnerian or strict reinforcement view (Bolles, 1967; Skinner, 1971), doesn't deny that people think or have expectancies, but it does argue that trying to find out what people think or expect is not a very fruitful way of explaining or controlling behavior. The reinforcement model operates outside the head and says that the way to explain choice behavior is to determine retrospectively the specific rewards that have strengthened particular responses in the past. Responses, or choices, that are followed by outcomes the individual values are strengthened. This is a simple but powerful idea. If we wish to change the behavior of an individual then we must provide outcomes (rewards) that will serve as reinforcers for these new behaviors. For example, the decision to pollute or not to pollute is a function of what outcomes are important reinforcers for a decision maker and who controls them.

At this point one should not make the mistake of most reviewers of Skinner's book and think of the "controller of rewards" as some new kind of technocrat or diety. Legislators, stockholders, vice presidents, boards of regents, parents, and the like will do quite nicely. We elect state legislators with mandates to write laws with which we hope to control our own behavior through various kinds of positive and negative reinforcement.

A more fruitful focus is to concentrate on the following elements in the Skinnerian position:

1. The most effective reinforcers are those which are most directly connected to the response, both in terms of the latency between response and reinforcement and in terms of operating on the individual's strongest needs.
2. Behavior is maintained at a much stronger level if a particular response is reinforced intermittently rather than each time it occurs.
3. Positive reinforcement is much more effective than negative. Unfortunately, our society seems to operate on the converse.
4. The outcomes which are really reinforcing behavior can only be known through empirical observation.

In sum, to understand choices vis-a-vis individual or collective decision making we must carefully examine the reinforcements which are available for each choice.

The Incremental or Anarchist Model

Certain sociologists and political scientists have provided yet a fourth model which might be labeled the incremental or controlled anarchist model (Lindblom, 1959; Allison, 1969).

The basic tenents of the model are again largely a reaction against the classic theory. Even administrative man is much too systematic a decision maker. The anarchist model assumes that in the real world outcomes are too numerous and complex and the relationship between alternatives and outcomes too poorly understood to permit any systematic comparison of alternatives via their relative utility, even if it's only to satisfice. Attempts to make decisions by evaluating outcomes will necessarily miss potential outcomes that will ultimately become extremely important.

The only factor which makes decision making anything but a random walk is that it is possible to compare alternatives one at a time against historical data which specify what in fact did result from very similar courses of action in the past. That is, the alternative actions which are considered only differ in small incremental amounts from past practice. Comparing alternatives to very similar alternatives for which the consequences are already known is considerably different from having to evaluate all potential outcomes for a number of alternatives. Budgets don't change by leaps and bounds, they go up and down rather gradually. We don't make massive attempts to rectify social inequities, we begin with small remedial "programs." Decision makers indulge in this incremental approach because it appears to minimize the risk of big mistakes (i.e. a large negative outcome) and allows them to deal with a world that's too complex to really know.

There is a second way which this model says unforeseen outcomes can be identified. First, it is a mistake to think of any business organization, governmental agency, community organization, etc., as a single monolithic decision maker. Almost all organizations are made up of competing power centers which take different views of potential outcomes and the utilities that are assigned to them. Further, most organizations are surrounded by a number of external publics, also with different views, which will be quick to point out their own special interests. Thus, even though any particular decision maker may overlook or try to forget important outcomes there are enough other power centers with different interests to force a concern with all of the important ones.

Some Empirical Results

The empirical decision making research generated by these alternative models has not been great. Considerable empirical work has centered around the SEU model (e.g. see Edwards, 1954) but it has been largely concerned with using simple laboratory tasks to demonstrate its internal validity such as the multiplicative relationship between probability and valence. An exception is a study by Vroom (1966) in which he was able to improve predictions of job choice by asking college graduates to rate the importance of various job outcomes and estimate the probability that they could attain each outcome from several competing offers. The reinforcement theorists have been concerned primarily with the acquisition of new responses (learning) and variations in effort expenditures (motivation). Their research has not dealt with complex decision making.

The March and Simon notions have generated a few case studies of complex business decisions (e.g. Cyert et al., 1956) which have generally shown support for the basic assumptions of the model, but the data base is neither large nor overly systematic. In the writer's opinion, this constitutes a perplexing gap in our knowledge about human decision making behavior. It is certainly not adaptive to have such a void, especially when there has been a fair amount of model building to guide research efforts. A study by Solberg (1966) does provide suggestive results even though it does not deal with administrative decision making. A series of interviews over a 10 month period were used to describe the job seeking and job choice behavior of M.I.T. graduates. From an analysis of the interview protocols the investigators concluded that the job seekers did not make comparisons among alternatives in terms of a composite utility function. Rather, they seemed to have a stereotype of what a desirable job offer should be like and once a specific offer came reasonably close to the stereotype an implicit choice was made which was seldom reversed even though a number of other alternatives or offers were explored. This new information was used to rationalize the implicit choice, not yet publicly acknowledged, rather than as "legitimate" grist for decision making. Solberg did not go on to explore the parameters of the stereotype.

Perhaps the only systematic body of data concerning complex decision making processes, and it also does not deal with managerial behavior, has been generated by studies of decision making in the employment interview (Carlson, 1969; Hakel, Hollmann, & Dunnette, 1970; Webster, 1964). By using standardized interview situations under a variety of experimental conditions, these investigators have been able to describe a number of important facets of this kind of decision making. Some of their major findings pertaining to the unstructured interview are:

1. Most interviewers reach a decision very early in the interview (i.e. the first 3 or 4 minutes) and subsequent questioning orients toward justifying that decision.
2. The influence of negative information far outweighs that of positive information.
3. There are pronounced contrast effects relative to the kind of applicants the interviewer has seen previously.
4. Interviewers have a pronounced stereotype about what a "good" applicant should be like and it has a significant effect on the favorableness of the decision. Each organization seems to generate its own stereotypes. For example, Carlson (1969) found that there is a different core stereotype concerning what is a "good" insurance agent that can be attributed to different insurance companies, even though the job itself is very similar across companies. Hakel et al. (1970) found that Certified Public Accountants and non-accountant college recruiters (who were interviewing accounting graduates) had far different stereotypes as to what was a good accountant.

The evidence concerning the existence and effects of stereotypes is directly in line with the March and Simon notion of satisficing. It is also a compatible manifestation of the Skinnerian notion of reinforcement history and to a lesser extent of the incremental model's emphasis on comparing new alternatives with the established one. As an explanatory concept, the notion of "stereotyped alternative" would seem to be a powerful one but so far it has been investigated in a very limited context. One could legitimately ask whether there are stereotyped strategies and stereotyped solutions that prevade organizations and dictate how problems are solved and decisions made.

4. Situational Influences on Management and Administrative Behavior

Although their importance has been acknowledged for a long time, the research attention devoted to situational determinants of management behavior has a relatively short history. The available research spectrum divides situational determinants into two principal classes--organizational structure and organizational climate. By structural properties are meant such things as organization size, number of hierarchical levels, and the ratio of management to non-management personnel. They can be given an objective specification. The term climate usually refers to relevant characteristics of the organization (e.g. prevalence of rewards, degree of autonomy granted to individuals, pressure for production, degrees of conflict) that are perceived by a substantial number of people in the organization. That is, climate factors exist as perceptions and they must be perceived similarly across people to be designated as a characteristic of organizations rather than individuals.

It is possible to conceptualize structural and climate factors as both predictor variables (or independent variables) and moderator variables in terms of their usefulness for explaining management behavior. That is, behavioral differences could flow directly from situational differences or situational differences could moderate (in the Ghiselli sense) the relationship between some other independent variable and management behavior.

a. Previous attempts to assess situational variables.

Structure. Important as such variables may seem, there have been few systematic attempts to develop indices of organizational structure. Perhaps the most popular a priori schema is that used by Porter and Lawler (1965). They grouped seven structural characteristics into two principal categories and used them as independent variables around which to organize studies of job satisfaction and individual performance. Their seven structural characteristics are as follows.

Intraorganizational	Interorganizational
1. Hierarchical level	5. Total organizational size
2. Line vs. staff	6. Organizational shape
3. Span of control	7. Centralization vs. decentralization
4. Size of individual's organizational subunit	

Again on an a priori basis, Evan (1963) has attempted to conceptualize the hierarchical characteristics of organizations and he suggests the following operational measures for each of three dimensions.

Hierarchy of skills

1. Distribution of training time for the occupations or jobs making up the organization.
2. Number of discriminable training time levels.

Hierarchy of rewards

1. Ratio of maximum to minimum earnings.
2. Salary ratios of adjacent positions.

Hierarchy of authority

1. Number of levels of authority.
2. Ratio of administrative to production employees.

Along a somewhat different line, Woodward (1965) has classified organizations and organizational subunits via their type of production system. She uses a three way classification: (1) unit production, (2) mass production, and (3) continuous process production. These variables were in turn related to other structural characteristics such as those described by Porter and Lawler and Even. However, while there have been many studies attempting to relate a priori structural characteristics to attitudinal data such as job satisfaction, we could find no studies using management behavior or performance as a dependent variable.

One landmark empirical effort to classify and measure structural characteristics is reported by Pugh, Hickson, Hinings, and Turner (1968). By means of a long painstaking series of field interviews, the investigators were able to obtain measures of 62 different aspects of organizational structure from 46 English firms of widely varying types. The data from the 46 firms were factor analyzed and four factors accounted for 70% of the variance. These were labeled as follows.

1. Structuring of activities, or the degree to which all types of activities in the organization are standardized, specialized, and formalized.
2. Concentration of authority, or really the degree of centralization versus autonomy in decision making.
3. Line control of work flow, or the degree to which the work force tends to be concentrated in line jobs and the degree to which the line exercises direct control over various functions.
4. Size of supportive elements, or the amount of activity auxiliary to the main work flow of the organization.

Even though the Pugh et al. study constitutes a giant step there are as yet no data relating these variables to behavior.

Climate. Organizational climate has been a more fertile research ground. Several studies have contributed to the beginnings of a taxonomy for this class of variables.

For example, Litwin and Stringer (1966) report a questionnaire developed via factor analysis to measure organizational members' perceptions in six different areas:

1. Structure. Perceptions of the extent of organizational constraints, rules, regulations, and "red tape."
2. Individual responsibility. Feelings of autonomy, of "being one's own boss."
3. Rewards. Feelings related to being confident of adequate and appropriate rewards--pay, praise, special dispensations--for doing the job well.
4. Risk and risk taking. Perceptions of the degree of challenge and risk in the work situation.

5. Warmth and support. Feelings of general good fellowship and helpfulness prevailing in the work settings.
6. Tolerance and conflict. Degree of confidence that the climate can tolerate differing opinions.

These dimensions proved to distinguish among various organizational subunits and have been incorporated into experimental studies.

A broader and somewhat more systematic study of climate dimensions is described by Schneider and Bartlett (1968). The research sites were a group of sales agencies making up two different insurance companies. An item pool of 299 items describing various characteristics of the agencies was administered to 143 management personnel, and the responses were factor analyzed. Among other things, the respondents were asked to indicate what managers did in the agencies, what agents did, how people were treated, and what kinds of people were in the agencies. Thus, the 143 managers were not describing their own climate (i.e. the organization above them), but what they perceived the climate of the organization below them to be. Schneider and Bartlett admit the possible biasing effect of having managers describe their own agencies.

Six factors emerged. Their labels and descriptions are given below.

1. Managerial support. Similar to the factor of consideration found in the Ohio State studies. It refers to managers taking an active interest in the progress of their agents, backing them up with the home office, and maintaining a spirit of friendly cooperation.
2. Managerial structure. Refers to the manager requiring agents to adhere to budgets, be knowledgeable regarding sales material, and produce new customers. It tends to be a "sales-or-else" factor.
3. Concern for new employees. Most of the items are typified by a concern for the selection, orientation, and training of a new agent.
4. Intra-agency conflict. Refers to the presence of ingroups or outgroups within an agency and the undercutting of managerial authority by the agents.
5. Agent independence. These items describe agents who tend to run their own business and do not pay much attention to management.
6. General satisfaction. Refers to the degree to which the agency sponsors periodic social get-togethers and the agents express satisfaction with various management and agency activities.

The final form of the questionnaire contains 80 items for the six factors. At a conceptual level Schneider and Bartlett view the agency climate factors both as possible predictors of later performance and as potential moderators of the relationship between selection information and performance measures. In the predictor instance an individual would be asked to respond with his preferences for climate characteristics and/or his expectancies, and they could then be correlated with later performance.

These two studies, together with two others by Taguiri (1966), and Kahn, Wolfe, Quinn, Snoek, & Rosenthal (1964), exhibit a reasonable amount of consistency such that five factors seem to be common across the five studies.

Campbell et al. (1970) have labeled these:

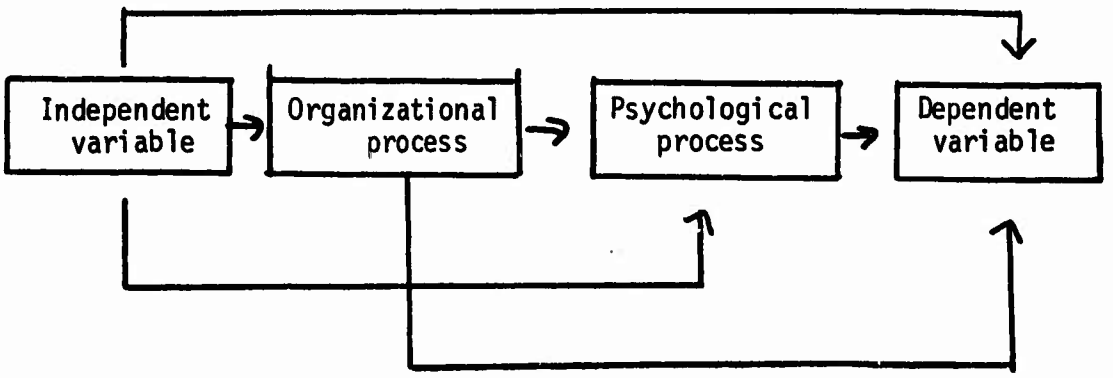
1. Individual autonomy, or the freedom of the individual to be his own boss and not having to be constantly accountable to higher management.
2. Structure or the degree to which the objectives and methods for the job are established and communicate to the individual by superiors.
3. General reward orientation or the level of rewards that are available.
4. Consideration and warmth or the support in a human relations sense that a manager receives from his superiors.
5. Cooperation vs. conflict which refers primarily to the relationships amongst peers of people in the immediate work group.

Undoubtedly these five factors do not represent the optimal classification, but they constitute a good start. Unfortunately, the instruments used in each of these studies are either limited in scope or quite specialized relative to the specific research setting. The objective of the research reported here was to develop a broad guage measure of organizational climate that could be used for comparative purposes across a wide variety of organizations.

b. Relationship of situational variables to management and/or administrative behavior. As has been noted above, there is almost no previous research relating the structural characteristics of organizations to behavior. One excellent reason for this is the rather long causal chain between a structural characteristic as an independent variable and behavior as a dependent variable.

To speak of the influence of "perceived feelings of autonomy" on managerial behavior is very different from speaking of the influence of "span of control" or some other such structural property. The linkage between environmental characteristics and behavior is much longer in the latter case and makes eventual investigation of cause and effect much more complex. Perceptions of climate and independent measures of organizational characteristics just do not operate on the same level of explanation. Obviously, a systematic study of the relationships between levels must begin on several fronts if any sense is ever to come of all this.

Indik (1965) has made one effort in this direction, and a brief examination of his paradigm might be helpful. He was interested in the linkage between organization size and the degree of an individual's "participation" in the organization. Between this independent and this dependent variable, Indik postulated two types of mediating variables: (1) organizational processes resulting from the size factor, and (2) psychological processes. Thus there are four elements in the chain and six possible bivariate relationships that can be examined. The paradigm is shown below.



Four different combinations of mediators were examined correlationally in three different research settings. The mediators accounting for the most variance were amount of communication and degree of task specialization, on the organizational process side; and felt attraction for other members and satisfaction with performance, on the psychological process side. Indik's analysis makes clear that focusing prematurely on independent variables that are too distant from the behavior of interest may obscure meaningful relationships or lead to explanations for "significant" results that are misleading.

Besides explaining why structural characteristics have not provided much explanatory power, the above may also explain why organizational climate variables have begun to show important relationships with administrative behavior.

For example, both Frederiksen(1966a) and Litwin and Stringer (1966) have carried out laboratory studies using "climate" dimensions as independent variables. The Frederiksen study is the most extensive and the most directly relevant for the present research. A total of 260 middle managers employed by the State of California worked through an In-basket Test designed to simulate the job of chief of the field service division of the Department of Commerce. Four treatment combinations designed to create differences in climate were arranged in a 2 x 2 design. One treatment dichotomy had to do with the general prevalence of "rules and regulations." Half the subjects were informed via instructions and In-basket materials that the Department of Commerce encouraged new ideas, innovation, and creative problem solving. They were told that rules existed but that they could be broken if they got in the way. The other half were told that a very substantial set of rules and regulations had been built up over the years and had proved very valuable and that they were not to be violated except under extreme circumstances. The second treatment factor was concerned with the closeness of supervision, and the subjects were told either that the organization preferred a subordinate's work to be closely monitored or that subordinates should be allowed to work out details for themselves.

The In-basket can be scored on a large number of indices (e.g. explains actions to peers, postpones decision, involves subordinates, and takes final action). In previous research, some sixty of these initial scores were reduced to a small number of first-order factors, and the dependent variable in this particular study was a second-order factor labeled "productivity," or the sheer amount of work accomplished. The subjects also provided a large amount of test and biographical data which served as 21 different predictor variables. The actual dependent variable under consideration was the predictability of the In-basket performance by the 21 predictors.

In general, it was found that predictability was higher under the innovative climate. The details of the analysis are too numerous to give here, but Frederiksen (1966a,p. 13) summarizes them with the following statement.

> It appears that the amount of administrative work in the simulated job is more predictable in a climate that encourages innovation than in one that encourages standard procedures, and that in an innovative climate (but not in a rules climate) greater productivity can be expected of people with skills and attitudes that are associated with independence of thought and action and the ability to be productive in free, unstructured situations.

Frederiksen also found that performance was more predictable for subjects who worked in a consistent climate (innovation + loose supervision or rules + close supervision) than for those who had to operate in an inconsistent environment (innovation + close supervision or rules + loose supervision).

In further analyses of the same study (Frederiksen, 1968) it was demonstrated that inconsistent climates also have a negative effect on productivity. Specifically, those subjects who were placed in a climate that encouraged innovation and was at the same time characterized by detailed supervision worked at a substantially reduced level of output. Digging still deeper in the data, Frederiksen (1968) was able to show that subjects employed different work methods under different climate conditions permitting more freedom, administrators dealt more directly with peers; while in the restrictive climates, they tended to work through more formal channels. In sum, the Frederiksen study yields a glimpse of the wide range of influences that climate differences can exhibit.

Litwin and Stringer (1966) used 45 students from the Harvard Business School and divided them into three "firms," which then had to compete in the construction and marketing of "radar equipment" manufactured from erector set materials. The simulated operation, or game, required considerable organization and cooperation on the part of the 15 players. Three different climates were created: (1) an authoritarian-structured business, with strong emphasis on careful definition of duties, the exercise of formal authority, etc.; (2) a democratic-friendly business, where cooperative behavior, group loyalty, teamwork, freedom from punishment, and a loose informal structure were emphasized; and (3) an achieving business, where innovation was encouraged, competitive feedback was given, pride in the organization was fostered, a certain amount of risk taking was deemed desirable, and high personal goals were encouraged.

The principal means for creating the climate differences was the president of the company who was a member of the research staff and who adopted the appropriate leadership "style." The expected differences were found on a questionnaire designed to measure the six climate factors discussed earlier. Playing of the game was continued over an eight-day period.

Significant differences in performance and satisfaction were found. The achieving business produced the most in terms of dollar volume, number of new products, and cost-saving innovations. However, the authoritarian-structured business produced finished goods with the highest quality, primarily be never deviating from the government specifications laid out in the game.

As yet another example of the explanatory power of the "climate" variable, Schneider (1969) used the Schneider and Bartlett questionnaire to study the effects on organizational performance of the discrepancy between superior and subordinate perceptions of the organization's climate. For a large sample of individual insurance agencies, the questionnaire was administered to the agency manager and to the salesmen. Perceived climate profiles were obtained by computing factor scores for each individual. For each agency the average correlation of the manager's profile with each of the salesmen was computed. There was a correlation (Spearman's Rho) of .89 between the ordering of these correlations and the ordering of amount of insurance sold for each agency.

Taken together, these three studies suggest the utility of organizational climate for helping to explain: (1) the level of individual performance; (2) an individual's choice of problem solving and decision making strategies; and, (3) the kinds of individual differences which are able to manifest themselves. Thus, any attempt to study administrative behavior in general or problem solving behavior in particular cannot be separated from a consideration of situational factors. Organizational climate has emerged as one of the most important of these.

Background Recapitulated

It was the purpose of the above discussion to build a case for the interconnectedness among problem solving and decision making process, the organizational context in which they occur, and the dependent variables used to study them. The problems associated with obtaining a taxonomy of administrative problem solving content were outlined and previous descriptive research was reviewed. Similar discussions were presented for alternative models of the decision making process, the measurement of situational variables, and the influence of the organizational climate on problem solving and decision making behavior.

PROCEDURE AND RESULTS

During the course of the project three kinds of studies were carried out. Those having to do with (a) developing a taxonomy of problem solving, (b) developing a measure of organizational climate, and (c) investigating decision making and problem solving processes. The methods used are the results found are discussed in turn under each of these three headings.

1. A Taxonomy of Administrative Problem Solving

We began with a thorough search of the literature pertaining to: (a) criteria of management and administrative performance; (b) taxonomic studies of managerial behavior; (c) the content of management training and development; (d) problem solving and decision making; and, (e) simulations of problem solving and decision making (i.e. business games, case problems, etc.). Relative to the last category we attempted to survey all the major resources of case problems and games used in management education, both to guide our own development of simulations and to add to our knowledge of the problem solving content of managerial jobs.

The next step was to conduct a series of interviews with a sample of managers in the Twin Cities' area. The purpose of the interviews was to gather a large number of specific descriptions of problem solving situations which would constitute a representative sample of the domain of managerial and administrative problem solving. The total number of managers interviewed was 68. They were sampled from four organizations--a large electronics corporation, an insurance company, a food manufacturer, and a public utility. Within each organization, individuals were sampled from line and staff positions and from two management levels. Thsse two levels corresponded roughly to the second level of management and to the fourth and fifth levels. There were no company presidents or vice presidents. The overall breakdown was as shown below.

	Org. #1		Org. #2		Org. #3		Org. #4	
	Line	Staff	Line	Staff	Line	Staff	Line	Staff
Mgt. levels 4 & 5	3	4	4	4	5	3	3	5
2nd mgt. level	5	4	5	5	4	4	5	5

The interviews lasted from one to two hours with the average being about 90 minutes. They were conducted by advanced graduate students, all of whom had previous relevant work experience. Some care was taken in developing the interview schedule and calibrating the interviewers. We wanted the interviewee to understand that we were attempting to sample the <u>content</u> of his problem

solving activity. We were not interested in evaluating his performance or finding out what his solutions might have been. He was asked to recall work problems during a series of specific time periods - within the past two days, within the past two weeks, within the past two months, and within the past year. Short of naming specific individuals he was also asked to be quite specific in his description. During the course of the interview, the interviewer tried to elicit 8-10 incidents. Each manager was also left with a booklet in which he was asked to record additional problem descriptions that might occur to him over the next several days. With one post card reminder about 50% of the sample returned their booklets with about 2-5 incidents each.

From the interview schedules and booklets, each specific problem description was typed on a separate index card. The cards were edited to eliminate duplicates or problems which still were stated too generally to be meaningful. The result was a sample of approximately 500 problem incidents.

This "domain" of content was examined independently by four judges (the principal investigator and 3 graduate students) each of whom suggested a possible taxonomy. Two different types of classifications emerged. One was stated in more abstract terms and dealt with the entities on which the manager's problem solving activity focused. At the first level in the taxonomy these were problems with: (1) equipment, (2) people, (3) organizational units, (4) procedures, (5) information, (6) tasks, and (7) time/money. The second level in this particular approach was formed by considering the manager's dealings with certain combinations of these seven entities. For example, trying to decide whether or not a subordinate had met a quarterly objective would be placed in a category as the intention of persons and tasks. When submitted to the retranslation procedure (i.e. asking independent judges to categorize the 500 incidents using the newly dervied taxonomy) this kind of classification scheme yielded far too many misclassifications. There was only 55-65% agreement between judges.

The second type of classification proved to be more successful and exhibited much higher inter-judge agreement (80-85%). It is stated in more concrete terms and is oriented more toward organizational language. There are two levels in the hierarchy with twenty seven in the first, or lower level, and eight in the second, or higher level.

Another group of managers was interviewed for the purpose of further sampling the problem solving domain. The respondents were obtained from a large automobile assembly plant and consisted of 32 managers sampled from both production and staff positions and from 4 management levels (foreman, general foreman, superintendent, and department manager). Each interview lasted one hour. Approximately one half the time was devoted to a description of specific job problems and one half to a discussion of the prevailing organizational climate. The problem descriptions were used to further refine the category definitions although few changes occurred. A brief outline of the classification and definitions of the categories are shown in Figure 2.

The format of the first operational form of the questionnaire is as follows. Each manager is asked to estimate the amount of time he spends on each of the eight second level categories, in terms of percent of his total working hours. For the first level categories within each of the eight second level categories he is asked to make two judgments. First, he is asked to rate the relative frequency with which he has to deal with that kind of problem. Secondly, he is asked to rate the relative importance of that kind of problem.

2. Measuring Organizational Climate

Starting from the basic premise that previous attempts to measure climate have been too narrow in scope or non-applicable across a variety of organizations we carried out an extensive literature search for possible dimensions that would describe the overall domain of organizational climate. Any and all sources that might suggest potential climate ingredients were utilized. The result was an a priori list of factors or dimensions that constituted our preliminary "best guess" as to the variables that comprise organizational climate. There were 22 such a priori dimensions and their labels and definitions are shown in Figure 3.

Pilot Study

Using these 22 dimensions as guides, a massive item writing task was undertaken to develop a questionnaire measure of climate. Initially, 10-20 items per dimension were written. Through extensive editing these were eventually pared to 5 items each. As an alternative measure, a single rating scale was developed for each factor such that an individual could rate his organization on each of the 22 dimensions. Thus, there would be available two methods (Likert-type items vs. rating scale) for measuring each of 22 a priori variables.

These two methods for measuring organizational climate were included in a study conducted in a large national retail organization. The questionnaire was administered to 256 department and division managers in a sample of retail stores in 3 geographic locations across the United States. These jobs comprise the first and second levels of management and involve selecting and ordering merchandise, maintaining inventories, managing sales promotions, and supervising sales staff. The questionnaire was administered by the local personnel manager after an explanation memo from the corporate personnel department.

The instructions for the questionnaire asked the respondent to describe the climate of the organization as a whole. To get some idea of how the individual store climate might differ from the climate of the entire organization, a subset of 25 of the items was repeated and the respondent was asked to use them to describe the particular store in which he worked. This was an attempt to determine the extent to which individuals would differentiate between these two referents.

For the 110 item description of the overall climate, a priori scale scores were obtained by simply summing the responses to the 5 items within each scale. The intercorrelation matrices for the 22 a priori 5 item scales and the 22 rating scales are shown in Tables 1 and 2. In general, the intercorrelations tend to be quite low. The average inter-r's are .25 and .12 respectively for scales vs. ratings. These are the mono method-multi trait matrices. The multi-trait, multi-method matrix showed a small but not overwhelming amoung of convergent validity. The average correlations between methods for the same a priori factor was .38. This significant but limited amount of convergent validity for the a priori factors suggested the use of empirically derived factors.

As noted above, the sample was obtained from three geographic locations. The mean a priori scale scores and the corresponding mean rating scale scores for the 3 geographic locations are shown in Table 3. Again, the significant scale differences are not strong ones but the pattern that emerges suggests significant scale discrimination among areas, which should become stronger as more homogeneous scales are developed. One striking aspect of Table 3 is that there is a one to one correspondence between the two methods in terms of how they rank the three geographic areas on 17 of the 22 variables. Such a result confirms the presence of convergent validity suggested bu the multi trait-multi method matrix. The scales are tapping meaningful variance (not just method variance) and their explanatory power should increase when they are combined into homogeneous empirical scales.

The intercorrelations for the 110 climate items were submitted both to a principal axis factor analysis and a hierarchical cluster analysis. The two methods did tend to converge around the following factors.

- Job Autonomy - the relative freedom people have from constant evaluation and close supervision
- Pressure and Stress - the degree to which people are pushed by deadlines, and the degree of taxing, demanding, and difficult work
- Organizational Competence - the degree to which the organization seems to plan ahead, does the right thing at the right time, meets crises well, etc.
- Commitment to Developing People - the time, effort, and resources the organization devotes to formal and informal training and development activities
- Reward Level - the degree to which the organization provides money, security, and recognition for people
- Performance/Reward Connection - the extent to which rewards are given for performance and not for knowing the right people, having the right background, etc.
- Social Relationships - the degree to which people are friendly and supportive of one another
- Conflict vs. Cooperation - the extent to which people compete with each other or work together in getting things done

Although encouraging, the dimensional analysis lacked clarity, many of the items did not cluster, and some of the item communalities were quite low.

Based on the data from the pilot study, the comments of the respondents, and additional comments from staff members here at Minnesota, the item pool underwent substantial revision. The revised items were then pretested by administering them in subsets (i.e. about 20 items per person) to 30 salaried personnel from a large automobile assembly plant. These were the same individuals mentioned previously who participated in the interviews on their problem solving activity. During the same interview they were also asked a number of open-ended questions about how they viewed the climate of their work group and the plant as a whole. These discussions suggested additional relevant items which were written, edited, and included in the pool.

The interviews also suggested an additional a priori factor which seemed to represent a subdomain of relevant content. It was labeled "competence of the work force" and refers to the overall level of skill and ability to get the job done on the part of individuals.

Assembly Plant Study

A subsequent study at a large automobile assembly plant had the following objectives.

1. To examine again the empirical clusters or factors that seemed to explain the individual item responses.
2. To determine if a significant portion of the variability in climate descriptions could be attributed to group or subunit differences.
3. To determine the association of climate scores with measures of work group performance.

Method. On the basis of our pilot efforts, we constructed a revised 85 item questionnaire which asked the subject to make two responses for each item. He was asked to describe both the climate of the entire organization and the climate of his immediate work group. This was a somewhat naked attempt to determine which referent was the most salient. The question format asked the subject to rate how descriptive each item was on a 6 point scale from "always true" to "never true."

The questionnaire was administered to 307 salaried personnel, approximately two thirds of whom were production personnel. For purposes of the later analysis, the subjects were arranged in work groups. That is, the actual structural arrangement of who supervised whom and who worked with whom was layed out. For example, we were able to identify 20 production work groups consisting of 8-10 foremen, and headed by a general foreman.

An alternation ranking procedure was used to rate the performance of both the work groups and their leaders. That is, the individual most familiar with all the general foremen, in this case the production manager, was asked to rank the overall performance of both the leader and the work group he supervised, keeping in mind that these two variables may or may not be highly correlated. These ratings were made three times, first at about the same time the questionnaire data were collected and twice more at approximately three month intervals.

The first step in the analysis was to obtain a meaningful set of climate scales. For reasons of parsimony and ease of understanding what we really wanted were simple sum scale scores based on groups of maximally homogeneous items. This dictated the cluster analysis model and a procedure similar to the Ward and Hook (1963) method of hierarchical cluster analysis was used to group items for both the total organization and work group descriptions. Very briefly, the method clusters one variable at a time and at each stage looks at all possible combinations of items so as to keep the average within group homogeneity as high as possible. In our case the index of homogeneity was simply the correlation coefficient and the aim was to maximize the average within cluster intercorrelation. The decision of what clusters to select as the final solution is at the

discretion of the investigator and can be based on the substantive meaning of the items within clusters, the number of clusters, and the magnitude of the intercorrelations within clusters compared to the cross correlations between clusters.

Results. The average inter item correlation within our two matrices was about .25 and we selected clusters which had average inter-r's of .50 or greater and seemed to be meaningful on the basis of their content. To push beyond this would have reduced most of the clusters to two items each and left the majority unclustered. Also, we avoided clusters which had been formed by combining two other major clusters. That is, they had to have been built up item by item. A list of the clusters and their definitions is shown in Figures 4 and 5.

Keep in mind that these represent maximally homogeneous subsets of items at that particular stage in the clustering process. As always the degree of homogeneity we can attain is governed by the rank of the matrix and the reliability of the items. Coefficient alpha varied between .70 and .90 with most toward the high end and the scale intercorrelations were in the .35-.55 range.

In terms of item content, seven of the clusters were identical across the two sets of descriptions. We interpret the greater number of clusters for the work group solution to mean that an individual develops more finely differentiated perceptions of the environment that's closer to home.

To determine if a significant portion of the variance could be attributed to subunit differences we did a one way ANOVA across nine different functional departments (not the same as our 20 work groups) for each of the total organization and work group description scales. An Eta coefficient was also computed for the main effect against the dependent variable. The p values for the obtained F ratio and the resulting Eta's are shown in Tables 4 and 5.

Although not huge, there is a significant portion of the variance that can be attributed to subunit differences. As would be expected from our notion of what climate is, the Eta's are somewhat larger for work group descriptions than for the total organization. Also, the differences in the means across departments tended to follow the pattern they should, given the content of the various scales and the nature of the department.

Table 6 shows the correlations of the group leader's description and average group member's description of both the work group and organizational climate with performance ratings at Time I.

Inspection of the correlations in Table 3 shows a number of [illegible] positive relationships. It takes r's of about .35-.40 to yield p values of about .05. The distribution is certainly not a random one with mean zero, but neither are the correlations overly large. The highest correlations indicate that rated performance is associated with higher Achievement Emphasis, Security vs. Risk, Recognition and Feedback, Openness vs. Defensiveness, and Status and Morale when the total organization is being described; and with higher Achievement Emphasis, Supportiveness, Security vs. Risk, and Training and Development Emphasis when the work group is being described. Keeping in mind that these are correlational data, they do seem to support a rather eclectic view of the principal themes in the leadership and human relations literature. The correlations with the

criterion measures at Time II and Time III decreased in a regular stepwise fashion. That is, it was a systematic decrease rather than a haphazard fluctuation.

In general the correlations for the leader descriptions yield higher correlations than for the average group member. However, it is encouraging that the same trends are true for both kinds of describers. It further supports the notion that there is some communality of climate perceptions across people in the same subunit.

To test the notion of whether the discrepancy between superior and subordinate climate perceptions is related to performance, the average algebraic differences when group member scores were subtracted from leader scores were correlated with rated performance. These correlations are shown in Table 7.

Again there are a number of correlations in the .35-.40 range, but almost all of them concern the descriptions of work group climate and they tend to be slightly higher for the relationship with work group performance than for leader performance.

To obtain a statistic which would reflect the overall discrepancy between leader and subordinate regardless of the direction, we computed the totals of the absolute differences. That is, for the organization climate and then for the work group climate we summed the absolute differences over people and over scales and then divided by the number of people in the group. The correlations of these quantities with the rating criteria for Time I are given in Table 8. Again, there is a moderate relationship with differences in work group descriptions but not for the total organization descriptions. The positive sign in the correlation says that greater variability about the leader is associated with higher performance ratings.

The data from the assembly plant were also used to investigate the similarities and differences in the cluster structure across different subsamples of the total sample. Specifically, hierarchical cluster analysis solutions were obtained for line vs. staff subsamples and for hi vs. lo hierarchical level subsamples. For the latter dichotomy, approximately equal subsamples were obtained by making the split between the first and second management levels. The variability in cluster solutions was also compared across random splits of the total sample. If the substantive splits yield greater variability in cluster solutions than the random splits, it suggests that people in different parts of the organization use different factors when describing its climate.

Results of cluster analysis of different samples of data were compared using a form of Goodman and Kruskal's lambda (Goodman & Kruskal, 1954, 1959, 1963). Lambda is an index ranging from .00 to 1.0, which reflects the degree to which one categorical listing of variables may be predicted from another. Lambda is computed from a bi-dimensional contingency table, with columns defined by groups, categories, or clusters of variables obtained for one sample, and rows by groups of variables obtained for another sample. Cell frequencies are determined by the number of variables common to both the row and column groups defining the cell.

Given these frequencies, lambda is computed by:

$$\lambda = \frac{\sum_j \max_k . f_{jk} + \sum_k \max_j . f_{jk} - \max_k f_{.k} - \max_j f_{j.}}{N_A + N_B - \max_k f_{.k} - \max_j f_{j.}}$$

where f_{jk} = cell frequency for cell (A_j, B_k)

$\max_k . f_{jk}$ = maximum cell frequency in column A_j

$\max_k f_{.k}$ = maximum marginal frequency summing over columns A_j (i.e. max. of $\sum_j f_{jk}$)

N_A = total number of variables categorized for sample A

Thus lambda gives a ratio of commonly clustered variables to total number of variables. If analyses of both samples give identical results, lambda = 1.0; if no item clustered for one sample appears in the clusters derived from the other sample, lambda = .00. Subtracting the maximum marginal frequencies from numerator and denominator eliminates the largest cluster from each method and reduces the chance that lambda will be greatly influenced by one or two large common groups, while the majority of items are not similarly clustered in the two samples.

Cluster comparisons of major interest were: (1) between plant descriptions for the total sample and work group descriptions for the total sample; (2) between cluster solutions obtained on line and staff subsamples for both plant and work group descriptions; (3) between cluster solutions obtained on hi and lo management levels for both plant and work group descriptions; and, (4) as a control, between clusters derived on various random splits for both plant and work group responses. Differences across subsamples which are more extreme than for the random subsamples may be considered to be something more substantive than sampling error.

Results of analyses were as follows.

1. Lambda computed between clusters for total plant and total work group descriptions was .806.
2. For plant descriptions:
   lambda computed between production and staff clusters was .294.
   lambda computed between hierarchical levels was .373.
   For work group descriptions:
   lambda computed between production and staff clusters was .352
   lambda computed between hierarchical levels was .403.
3. Within plant descriptions, three random samples (N=151) were taken with replacement. The inter-lambdas among these three samples were .470, .440, and .463, with a mean of .458. Two random samples without replacement (N=151) were also taken; lambda between these random halves was .382.
   Within work group descriptions, inter-lambdas among three random samples (N=152) with replacement were .524, .486, and .480, with a mean lambda of .497. Lambda between two random samples without replacement (N=152) was .440.

In sum, the value of lambda between total sample, plant description, and total work group description clusters is very high, indicating a similar perception of underlying climate structure in plant and in work group. Within plant responses, the correspondence between production and staff clusters is quite low compared to the clusters derived from random subsamples, implying that line personnel perceive climate structure differently than do staff personnel. Lambda computed between hi and lo hierarchical level does not deviate greatly from the value computed between random subsamples, indicating that perceptions of climate structure over different management levels are characterized by neither great homogeneity nor striking heterogeneity. Similarly, for work group descriptions, line and staff perceptions of climate structure are relatively differentiated, while neither similarities nor differences between different management levels are particularly impressive. Our tentative conclusion is that line vs. staff is an important parameter to consider when determining the taxonomic structure of organizational climate perceptions but hierarchical level is not. Whether this result can be generalized to additional kinds of functional and level differences is a matter for further research.

3. Investigation of Decision Making Processes

The general procedure in this series of studies was first to develop a simulated decision situation in the form of a case problem based on a specific category of the problem solving taxonomy. The specific informational content of the case was then determined by the parameters of a particular decision making model. For example, the SEU model implies that outcome valences and the perceived probability of outcome occurrences are important parameters which should be varied experimentally to determine their effects on decision making behavior. The Carnegie model suggests that the decision stereotype (i.e. satisficing), the immediacy of outcomes, and the relative quantifiability of outcome valences are additional important parameters to be varied in an experimental study.

During the term of the contract there was an opportunity for one small pilot study (Study I) and one prototype study (Study II) of the decision making process.

Study I

The general procedure in the pilot study was to present the facts of the case in written form and then ask the subject to indicate the course of action he wished to follow and to describe the factors that led to that decision. The response was in writing and was open ended. The subject could write as much or little as he wished.

The case developed for this study, as well as the next, involved the response of a chemical firm to market pressure for the expansion of production versus governmental pressure for pollution control.

The independent variables manipulated within the case were based on considerations of the SEU model and consisted of the following. The aim was to determine their relative importance in influencing decision making behavior.

A. The probability that the company would be penalized if it violated pollution control standards (high vs. low probability).
B. The severity of a penalty if the company was penalized (severe vs. light penalties).
C. The probability that the demand for the company's products would rise significantly (high vs. low probability).

Eight variations of the case were developed on the basis of the permutations of the two levels of each of the three independent variables. The dependent variables consisted of the subjects' responses to three open ended questions.

1. What course of action should be taken?

2. What factors were most important in coming to a decision?

3. What goals were being satisfied by the course of action chosen?

Rating scales were established for Questions 1 and 3 based on the degree to which pollution control or expansion were being emphasized. The expressed goal was rated twice, once for emphasis on pollution control and once for emphasis on expansion. Categories were established for the responses to the important factors question. The course of action question was rated on a five point scale, the goals on three point scales, and eight categories were established for the important factors question.

Three independent raters then rated the course of action chosen and the goals sought. There was a 75% agreement on the course of action ratings and a 66% agreement on the goals rating.

The subjects were also asked to indicate at what point in the reading of the case that the actual decision was made as to the course of action selected (i.e. before reading half the case, before finishing the case, soon after finishing, after a fair amount of time).

The subjects were 66 undergraduate and graduate students at the University of Minnesota and the case problem was administered in a group setting.

Because of the relatively small sample size, few inferences can be drawn from the results themselves. However, the data are suggestive that it is the interactions and not the main effects which are significant. The principal benefit from the study has to do with modifications in the methodology. The open ended response format created certain difficulties. The agreement between coders was not as high as we had hoped, there was a great deal of variation in the "richness" of the individual protocols, and some subjects complained about having to write so much. As a consequence it was decided to modify the case to permit responses to be precoded and to present segments of information sequentially so as to help tease apart the interaction effects.

Study II

The general procedure in Study II was to break the informational content of the case into segments, present the segments sequentially to the Ss and ask a series of questions after each segment. The order of the segments was counterbalanced.

The case used in the second study was a revision of the first and was written such that there were seven modular parts describing the decision situation faced by the company (i.e. the company's history with respect to pollution control, the likelihood of an increase in the demand for their products, the effect an expansion would have on the community, and the position of competing companies on the problem). The decision involved the allocation of financial resources to a pollution control program and/or an expansion program.

The independent variables manipulated within the case were similar to those in Study I with the addition of immediacy of outcome and order of information presentation. The specific variables manipulated were as follows.

A. The order in which information was received in the case (i.e. pollution control information followed by expansion information or presentation in the reverse order).
B. The probability of violating pollution standards (low vs. high probability).
C. The immediacy of violating pollution standards (occurrence in the immediate vs. the distant future).
D. The probability of an increase in market demand for products (low vs. high probability).
E. The immediacy of an increase in market demand (occurrences in the immediate vs. the distant future).

There were 32 variations of the case based on the permutations of the two levels of each of the five independent variables.

The case was divided into seven moduls or segments and following each of the seven segments of the case five multiple choice questions were asked of each subject.

1. To what extent will the preceding segment of information affect the decision you make? The subject was asked for a rating on a 5 point scale.

2. What course of action would you select given your present knowledge about Mason Chemicals? The subject could choose from among seven possible alternatives arranged on a continuum ranging from all resources devoted to pollution control to all resources devoted to production expansion.

3. How important is expansion? (5 point scale)

4. How important is pollution control? (5 point scale)

5. How confident are you in your decision? (5 point scale)

Following the last set of multiple choice questions the subjects were asked to:

1. Rank the seven segments of information as to their effect on the decision reached.

2. Indicate at which point in the case the final decision was actually made.

3. To indicate the order in which the information would have been asked for if one had been able to select the order of information.

The subjects were 129 advanced undergraduate and graduate students at the University of Minnesota who were enrolled in a course dealing with the social psychology of organizational behavior. The class was composed of approximately equal proportions of majors in psychology and majors in business administration.

The data were analyzed via a series of three-way ANOVA's using decisions made at various stages and also the variance in decisions across segments as dependent variables. Few main effects were significant. The variable which consistently produced the largest main differences in decision making was the immediacy of the outcome, which is in line with what the Carnegie model specifies as being important. It is interesting to note that, even though the effects were small, the immediacy variable took precedence over valence and expectancy. This in spite of the fact that when asked what kind of information was the most important for making the decision, the probability of an outcome's occurrence was ranked as more important.

There were a number of significant two way interactions all of which involved either the order of information or the immediacy variables. Again the overall impression is that it is the interactions, not the main effects, that account for the most reliable variance.

In terms of the variability of decisions across segments there seemed to be a fair amount. However, the data suggest that when the final decision was called for, subjects tended to return to the position they held at Stage 1 and 2. Although it is not pronounced, this finding is consistent with the notion that individuals have a stereotyped alternative for situations such as this and tend to interpret the facts to be consistent with their stereotype, rather than vice versa.

SUMMARY STATEMENT

This research has proceeded along three fronts: (1) development of a taxonomy of real world managerial problem solving and decision making behavior; (2) development of measures of the perceived organizational environment; and (3) investigation of problem solving and decision making processes. As a result there now exist a viable problem solving taxonomy with which to describe managerial behavior or develop dependent variables for experimental study. The perceived environment has been studied more thoroughly than in previous research efforts and a much more complete measuring instrument exists for assessing the major facets of organizational climate. The individual climate factors have been shown to be related to various measures of individual and work group behavior. The studies of the decision making process suggest that people have individual stereotypes of what a "good" alternative or solution is in a specified situation and it is difficult to dissuade them via information. The information with the most power seems to be that pertaining to the time it will take for the various outcomes to manifest themselves. It remains for future research to explore these processes more fully and to determine the effects of varying the perceived environment on problem solving and decision making behavior.

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Table 1. Intercorrelations of 22 a priori climate scales.

1.00																						
-.22	1.00																					
-.15	.53	1.00																				
-.22	.46	.56	1.00																			
-.24	.06	.09	.07	1.00																		
.04	.53	.55	.52	-.17	1.00																	
-.12	.42	.58	.64	-.02	.58	1.00																
-.18	.40	.50	.56	.06	.43	.59	1.00															
-.10	.67	.59	.56	-.09	.70	.67	.56	1.00														
-.10	.34	.34	.21	.24	.12	.16	.30	.26	1.00													
-.02	.52	.51	.57	-.15	.68	.57	.51	.71	.17	1.00												
-.13	.55	.50	.51	-.01	.54	.58	.41	.72	.34	.68	1.00											
-.24	.53	.55	.63	-.00	.57	.60	.52	.67	.20	.65	.61	1.00										
-.05	.56	.48	.45	.02	.49	.48	.51	.60	.45	.50	.64	.60	1.00									
-.20	-.44	-.39	-.32	.15	-.52	-.32	-.27	-.55	-.19	-.40	-.46	-.33	-.45	1.00								
-.10	.34	.44	.34	-.18	.41	.42	.37	.45	.02	.42	.46	.37	.30	-.39	1.00							
-.07	.61	.62	.55	-.09	.61	.59	.49	.73	.31	.62	.67	.77	.69	-.48	.44	1.00						
-.21	.61	.66	.62	.01	.60	.55	.63	.66	.29	.66	.59	.72	.60	-.33	.45	.75	1.00					
-.23	.46	.50	.43	.01	.46	.47	.32	.58	.18	.52	.63	.64	.54	-.40	.47	.64	.55	1.00				
.03	.43	.31	.38	-.18	.42	.40	.35	.48	-.05	.48	.33	.35	.25	-.35	.46	.40	.46	.42	1.00			
-.10	-.50	-.56	-.47	.30	-.64	-.45	-.39	-.69	-.15	-.55	-.53	-.48	-.52	.62	-.50	-.58	-.54	-.47	-.51	1.00		
-.11	.64	.51	.52	.03	.51	.52	.43	.65	.34	.63	.70	.53	.56	-.44	.48	.60	.60	.61	.51	-.52	1.00	

Table 2. Intercorrelations of 22 ratings of organizational climate dimensions.

1.00																					
.08	1.00																				
.09	.35	1.00																			
.24	.13	.04	1.00																		
.03	-.03	-.10	.20	1.00																	
.12	.31	.47	.19	-.24	1.00																
.08	.25	.29	.09	.06	.35	1.00															
.18	.16	.27	.11	-.12	.28	.36	1.00														
.11	.27	.26	.26	-.09	.64	.52	.33	1.00													
.27	.05	.10	.22	-.01	.17	.17	.21	.27	1.00												
.07	.29	.24	.22	-.25	.63	.30	.22	.57	.11	1.00											
.17	.23	.29	.32	-.24	.59	.28	.34	.51	.27	.51	1.00										
.10	.31	.30	.11	.09	.37	.29	.31	.37	.26	.23	.25	1.00									
.14	.31	.08	.24	.01	.27	-.04	.15	.20	.29	.05	.33	.42	1.00								
-.13	-.02	-.04	.08	.20	-.33	-.07	-.02	-.29	.02	-.22	-.24	.07	.10	1.00							
-.06	-.04	-.17	.04	.19	-.33	-.05	-.17	-.18	-.11	-.21	-.26	-.03	-.01	.36	1.00						
.01	.31	.23	.17	-.17	.29	.24	.24	.45	.23	.20	.28	.46	.31	-.04	-.01	1.00					
.20	.28	.17	.18	-.13	.42	.28	.31	.57	.25	.32	.44	.47	.35	-.07	-.12	.59	1.00				
.04	.28	.29	.08	-.03	.34	.20	.29	.28	.16	.24	.33	.33	.16	-.11	-.14	.35	.38	1.00			
.04	-.15	-.07	.11	.09	-.03	.01	-.14	-.03	.02	-.12	-.05	-.03	-.17	-.07	.08	-.09	-.02	-.25	1.00		
-.15	-.29	-.30	-.07	.15	-.46	-.20	-.15	-.38	-.09	-.51	-.32	-.35	-.04	.25	.17	-.17	-.42	-.24	.13	1.00	
.16	.34	.38	.15	-.13	.58	.27	.29	.46	.22	.53	.51	.25	.18	-.20	-.16	.34	.40	.32	-.09	-.40	1.00

Table 3

Means of Scale Scores and Ratings for 22 a priori

Organizational Climate Dimensions

CLIMATE DIMENSION	SCALE MEANS			RATING MEANS		
	Mid-West	South-East	South-West	Mid-West	South-East	South-West
1. Autonomy	3.4	3.7	4.0	4.2	4.5	4.8
2. Development Orientation (toward mgrs. already in org.)	4.2	3.6	4.1	5.7	4.6	5.2
3. Development Orientation (toward new mgrs.)	4.7	3.9	4.1	5.1	4.2	4.4
4. Involvement with the organization	4.5	4.1	4.2	4.3	4.5	4.6
5. Organization Expectations	4.0	3.9	3.9	2.8	4.1	4.2
6. Satisfaction	4.3	3.7	4.1	5.6	4.4	4.7
7. Conflict & Cooperation	4.5	4.0	4.1	5.6	4.7	4.9
8. Social Relations	4.6	4.2	4.4	5.3	4.6	5.1
9. Supportiveness	4.7	4.0	4.4	5.4	3.8	4.2
10. Structure	4.5	4.2	4.5	5.2	4.8	5.2
11. Level of Rewards	4.4	3.9	4.1	5.0	4.3	4.6
12. Performance/Reward Dependency	4.8	4.0	4.2	5.5	4.6	4.8
13. Status of Goods and/or Services	5.5	4.7	4.9	6.5	5.3	6.2
14. Motivation to Achieve	5.0	4.5	4.9	6.6	6.0	6.6
15. Pressure	3.5	3.5	3.3	4.8	4.5	4.9
16. Status Polarization	4.0	3.8	3.8	4.4	4.2	4.5
17. Intelligence in responding to the environment	4.9	4.1	4.6	6.3	4.7	5.3
18. Concern with Internal Operations & Planning	4.8	4.1	4.3	5.7	4.3	5.1

Table 3 (continued)

CLIMATE DIMENSION	SCALE MEANS			RATING MEANS		
	Mid-West	South-East	South-West	Mid-West	South-East	South West
19. Flexibility & Innovation	4.6	4.1	4.1	5.4	4.7	4.9
20. Decision Centralization	3.4	3.5	3.4	3.8	4.0	3.9
21. Environmental Severity	2.7	2.9	2.7	3.4	3.9	3.3
22. Knowledge of Results	4.4	4.1	4.1	4.7	4.1	5.2

Table 4

Summary of One Way ANOVA's for Mean Differences in Climate Scales used to describe the Work Group

The Independent Variable is Department Membership

	Scale	Summary of ANOVA p	Eta
1.	Task Structure	00	31
2.	Reward/Performance Relationship	01	29
3.	Decision Centralization	01	28
4.	Achievement Emphasis	02	27
5.	Training & Development Emphasis	01	30
6.	Security vs. Risk	00	31
7.	Openness vs. Defensiveness	00	32
8.	Work Group Reputation	10	24
9.	Satisfaction & Morale	00	31
10.	Supportiveness	00	33
11.	Initial Job Orientation	00	36
12.	Problem Solving Ability	03	26
13.	Concern for Excellence	00	32

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Table 5

Summary of One Way ANOVA's for Mean Differences in Climate Scales used to describe the entire Organization

The Independent Variable is Department Membership

	Scale	Summary of ANOVA p	Eta
1.	Task Structure	09	24
2.	Reward/Performance Relationship	05	26
3.	Decision Centralization	06	25
4.	Achievement Emphasis	02	27
5.	Training & Development Emphasis	01	29
6.	Security vs. Risk	03	27
7.	Openness vs. Defensiveness	02	27
8.	Status & Morale	13	23
9.	Recognition & Feedback	16	23
10.	General Organizational Competence & Flexibility	03	27

Table 6

Correlations of Leader and Average Group Member Climate Descriptions with Ratings of Leader and Work Group Performance at Time I (N = 20 groups)

		Climate Scales	Correlations for Ldr. Descriptions with: WG Perf. Ratings	Ldr. Perf. Ratings	Correlations for Average Group Mbr. Desc. with: WG Perf. Ratings	Ldr. Perf. Ratings
PLANTATION	1.	Task Structure	-.22	-.24	-.17	-.16
	2.	Reward/Performance Relationship	.03	-.08	.19	.14
	3.	Decision Centralization	.07	.08	.45	.38
	4.	Achievement Emphasis	.34	.36	.18	.15
	5.	Training & Development Emphasis	.24	.14	.15	.16
	6.	Security vs. Risk	.35	.38	.14	.15
	7.	Openness vs. Defensiveness	.40	.41	.46	.45
	8.	Status & Morale	.45	.53	.08	.11
	9.	Recognition & Feedback	.41	.42	.37	.31
	10.	General Organizational Competence & Flexibility	.22	.16	.09	.01
WORKGROUP	1.	Task Structure	-.28	-.24	.06	.08
	2.	Reward/Performance Relationship	-.03	-.09	.08	.05
	3.	Decision Centralization	-.12	-.07	.37	.33
	4.	Achievement Emphasis	.46	.40	-.20	-.20
	5.	Training & Development Emphasis	.48	.41	.00	.00
	6.	Security vs. Risk	.34	.38	.01	.02
	7.	Openness vs. Defensiveness	.10	.11	-.11	-.08
	8.	Work Group Reputation	.30	.26	-.40	-.24
	9.	Satisfaction & Morale	.26	.22	-.09	-.05
	10.	Supportiveness	.35	.37	-.11	-.06
	11.	Initial Job Orientation	.27	.27	.13	.15
	12.	Problem Solving Ability	.30	.24	-.11	-.05
	13.	Concern for Excellence	.28	.25	-.06	-.08

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Table 7

Correlations of Rating Criteria with Mean Algebraic Difference between Leader and Group Member Climate Descriptions (General Foreman-Combined Shifts)

		Climate Scale	Work Group Performance	Leader Performance
PLANT	DESCRIPTION	1. Task Structure	-.10	-.11
		2. Reward/Performance Relationship	-.10	-.16
		3. Decision Centralization	-.12	-.07
		4. Achievement Emphasis	.27	.29
		5. Training & Development Emphasis	.12	.03
		6. Security vs. Risk	.29	.32
		7. Openness vs. Defensiveness	.07	.09
		8. Status & Morale	.40	.45
		9. Recognition & Feedback	.20	.24
		10. General Organizational Competence & Flexibility	.02	-.08
WORK GROUP	DESCRIPTION	1. Task Structure	-.28	-.27
		2. Reward/Performance Relationship	-.06	-.11
		3. Decision Centralization	-.25	-.20
		4. Achievement Emphasis	.50	.45
		5. Training & Development Emphasis	.40	.34
		6. Security vs. Risk	.37	.40
		7. Openness vs. Defensiveness	.12	.11
		8. Work Group Reputation	.43	.34
		9. Satisfaction & Morale	.33	.27
		10. Supportiveness	.36	.35
		11. Initial Job Orientation	.18	.19
		12. Problem Solving Ability	.32	.25
		13. Concern for Excellence	.29	.28

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Table 8

Correlations of Criterion Ratings with the Sum of the Absolute Differences between Group Members and their Leader on all Scales describing the Total Organization Climate and all Scales describing the Work Group Climate

Mean Absolute Differences between Leader & Group Member Descriptions Average over # of People in Work Group	Criterion Ratings	
	Work Group Performance	Leader Performance
Summed over all scales describing Plant Climate	-.06	-.08
Summed over all scales describing Work Group Climate	.36	.33

Figure 1

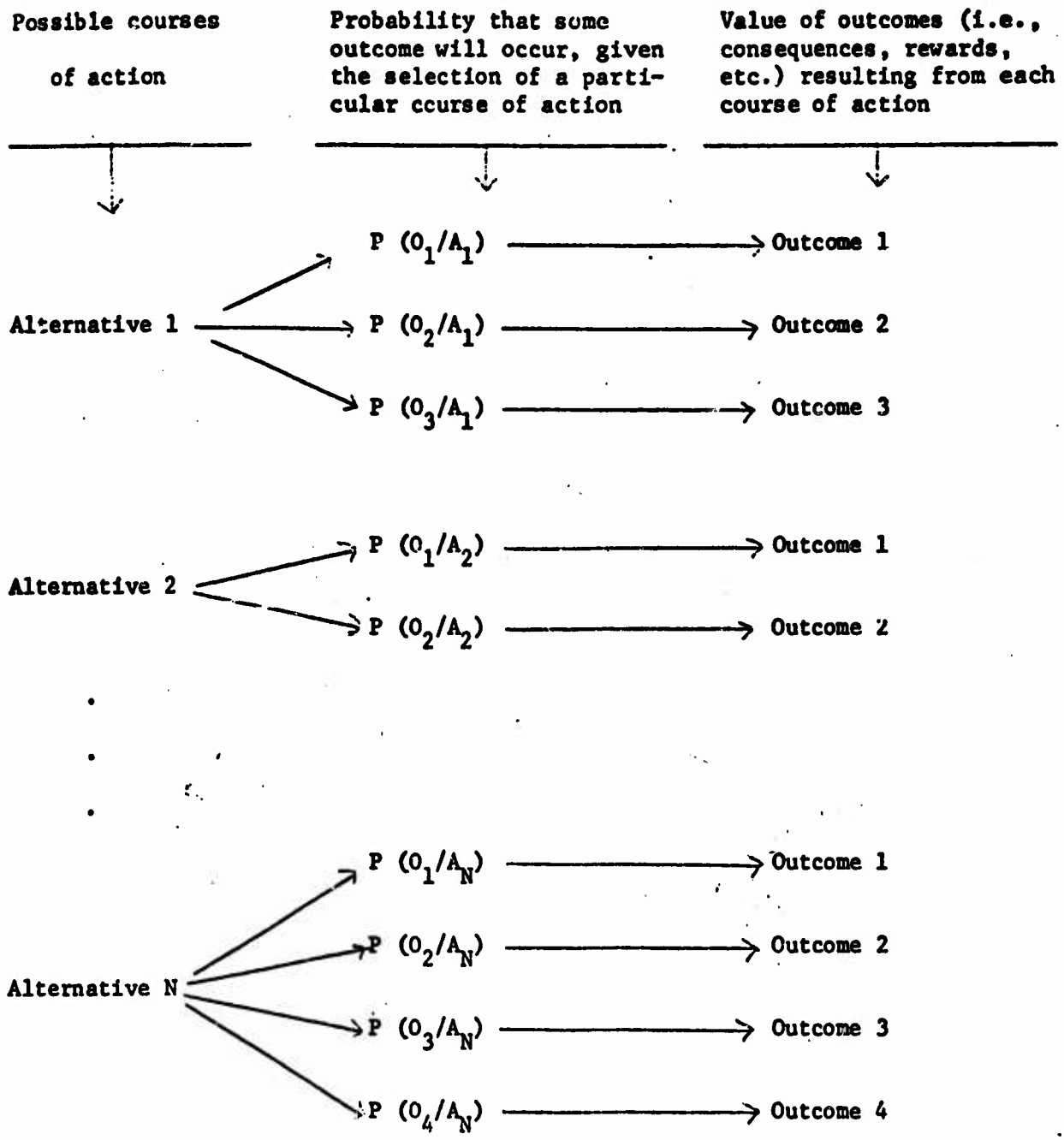
Possible courses of action
Probability that some outcome will occur, given the selection of a particular course of action
Value of outcomes (i.e., consequences, rewards, etc.) resulting from each course of action
Alternative 1
P (O_1/A_1)
Outcome 1
P (O_2/A_1)
Outcome 2
P (O_3/A_1)
Outcome 3
Alternative 2
P (O_1/A_2)
Outcome 1
P (O_2/A_2)
Outcome 2
Alternative N
P (O_1/A_N)
Outcome 1
P (O_2/A_N)
Outcome 2
P (O_3/A_N)
Outcome 3
P (O_4/A_N)
Outcome 4

Figure 2

A Tentative Taxonomy of Managerial and Administrative Problem Solving Behavior

I. Setting Goals
   A. Preparing budgets - the actual process of decided the allocation of resources for the next fiscal period.
   B. Setting goals and priorities - the actual process of deciding on work goals that must be achieved in a specified time or setting priorities that determine the order in which the goals must be met.

II. Work Process Problems
   A. Determining and administering work schedules for subordinates - includes both long and short term decisions about who will do what and when, and adjusting for absentee employees.
   B. Adjusting for cyclical operations - dealing with fluctuations in the need for both equipment and manpower when the fluctuations are relatively long term cycles resulting from seasonal changes, model changeover, etc.
   C. Determining work methods - includes the major decisions about how individuals should do their jobs.
   D. Determining work processes and work flow - as distinct from determining the specific methods an individual uses to perform his job, this category refers to structuring the processes used by the work group, to produce its goods and/or services. This might include the layout of machinery or work spaces, deciding what equipment to use.

III. Personnel Problems
   A. Recruiting and selecting subordinates - essentially, how much time and effort in trying to find suitable candidates and then select new people for existing jobs that are vacant, new jobs, or jobs that are yet to be created. Includes helping other people recruit and select for their work groups as well as for your's.
   B. Training and developing subordinates - includes any and all efforts to provide useful on the job guidance, job rotation, constructive feedback, or arrangements for formal training programs.
   C. Appraising subordinate performance - includes both the devising of ways and means for evaluating subordinate performance and the actual use of whatever procedures are decided upon.
   D. Maintaining an equitable reward structure - entails the problems of recommending pay raises and handing out status symbols such that people are rewarded fairly in terms of their contributions. Includes the problem of balancing the high salaries needed to attract new staff, with the need to maintain salary differentials between experienced and less experienced people.
   E. Motivating subordinates - trying to find ways to ensure that subordinates will come to work regularly, put out reasonable effort, and maintain a firm commitment both to the job and to the organization.

IV. Information Gathering and Presentation
   A. Preparation of progress reports - determining the form and content of both written and oral reports that accurately reflect the state of affairs

in the unit. Includes the problem of deciding what information will be most useful for higher management decision making and at the same time will not invite an over reaction if it happens to be negative.

B. Preparation of proposals - putting together arguments to higher management for such things as new personnel, new equipment, or money to begin a new project.

C. Getting information - the process of gathering the necessary information to make specific decisions. Includes balancing the cost of the information against its usefulness without being flooded by it.

D. Staying knowledgeable - the general problems involved in keeping up with what's going on such that you know what your people are doing and thinking and you know what state your equipment and work activities are in.

V. Anticipating Future Events

A. Anticipating problems - involves a continual review of the organization and its environment with the aim of anticipating potential problems and dealing with them before they become serious.

B. Forecasting or predicting future events - involves coming up with regular forecasts or predictions of things like sales, productivity, manpower needs, project completion dates, and the like. These are a recurring part of the job and cover a fairly long span of time.

VI. Cost vs. Benefit Analysis

A. In-house vs. outside help - refers to the problem of deciding whether a unit should gear up to perform a particular function or do a particular job itself or should the activity be "subcontracted" to another unit.

B. Choosing between the old and reliable vs. new and risky - refers to deciding between two alternatives: (1) should the organization or organizational subunit invest in or develop a new process, piece of equipment, or product; or, (2) should it stick with the old process, equipment, or product.

C. How much to invest before quitting - refers to decisions about such things as how much money to invest in a project before deciding it won't work, how many men to commit to a project that may fail, etc.

VII. Special Problems and Crises

A. Troubleshooting - digging into the reasons why something went wrong. It's an after the fact investigation designed to find out what went wrong. Includes troubleshooting things like errors in predicting production levels, sales, costs, etc., and errors in the production process.

B. Overcoming failures in the system - as distinct from troubleshooting, this refers to figuring out how to correct mistakes that have been made and then getting the job done.

C. Union relations - dealing with problems posed by union work rules, grievances, threats of grievances, etc.

D. Working around the structure - refers to making adjustments or compensations for company directives, government regulations, or work process specifications that are incomplete, unclear, or are a hindering to getting the job done.

E. Dealing with external pressures - developing responses to pressures, requests, or threats from government agencies, community groups, environmental conditions, etc. This category is meant to include any such activity that arises from outside the organization and would not be considered an expected part of its work processes.

VIII. Dealing with the External Business Environment

A. Marketing finished goods or services - refers to the manager's efforts to figure out how to increase the consumption of the goods and/or services produced by his unit.

B. Obtaining raw materials - refers to the problems associated with obtaining the proper amount of raw materials, at the right price, at the right time, and with a minimum of defects. This category is meant to include only tangible goods as raw material. It does not refer to such intangibles as artistic creativity or the like.

Figure 3

Initial Climate Scale Definitions

1. (AUTONOMY)--Degree of freedom managers have in day to day operating decisions such as when to work, when not to work, and how to solve job problems. Includes freedom from constant evaluation and close supervision. Once the job has been defined and the objectives and methods set, the individual has complete freedom to do as he pleases within those broad constraints; the freedom to be your own boss.

2. (DEVELOPMENT ORIENTATION--toward managers already in the organization)--Degree to which the company tries to continually develop its experienced managers either through in-house training and development, or by encouraging and providing learning experiences outside the organization. Includes the extent to which the organization's resources are expended in this area.

3. (DEVELOPMENT ORIENTATION--toward new managers)--Degree to which resources are expended in the initial orientation and training of new (lower level) managers. Such resources could include the amount of attention and planning given to these programs as well as money, manhours, etc. Includes not only that aspect directed at improving performance, but also how well it reduces the initial anxiety and frustration of the new man.

4. (INVOLVEMENT with the organization)--Degree to which managers "live their jobs," and really do not leave the job (psychologically) when they leave the office; extent to which they take a strong interest in the activities of the company that are not directly related to the performance of their own job; the amount of commitment they have to the organization.

5. (ORGANIZATION EXPECTATION)--Degree to which the organization expects the manager to give "body and soul" to his job. Degree to which things are expected of the manager which are really "traditional" expectations such as special attitude, off-the-job behavior, intense loyalty, willingness to put the organization ahead of the family, etc. The previous factor, (INVOLVEMENT), referred to the manager's own commitment. This factor refers to the organization's expectation of what that commitment should be.

6. (SATISFACTION)--Overall level of job satisfaction exhibited by the managers in this organization; extent to which they are happy with their jobs; absence of complaints, high level of morale.

7. (CONFLICT VS. COOPERATION)--Degree to which managers either compete with each other or work together and with other people in the organization in the process of getting things done; extent to which managers try to integrate their own personal goals with those of other managers and the goals of the organization; includes conflicts related to getting the job done and competition for scarce resources and such as materials, clerical help, etc.

8. (SOCIAL RELATIONS)--Degree to which the organization has a friendly and warm social atmosphere. This factor does not have to do with conflict or cooperation in getting the job done, rather it refers to the pleasantness (or existence) of informal social relations both within and between organizational levels.

9. (SUPPORTIVENESS)--Degree to which the organization is interested in and is willing to support its managers in both job and non-job related matters. Extent to which the company tries to satisfy managers' needs for recognition and belongingness over and above traditional methods such as financial compensation, benefits, etc. Interest in the welfare of the managers.

10. (STRUCTURE)--Degree to which the organization specifies the methods and procedures used to accomplish tasks. This factor does not involve the presence or absence of supervision or evaluation. It is really the degree to which the organization likes to specify and codify, set up organizational structures and write things down in a very explicit form.

11. (LEVEL OF REWARDS)--Degree to which managers are well rewarded; this includes salary, fringe benefits, and other status symbols.

12. (PERFORMANCE REWARD DEPENDENCY)--Extent to which the reward system (salary, promotions, benefits, etc.) is fair and appropriate; degree to which these rewards are based on worth, ability, and past performance rather than factors such as luck, who you know, how well a manager can manipulate people, etc.

13. (STATUS OF GOODS AND/OR SERVICES)--Reflects the degree to which the organization is a prestigious place to work. This prestige or high social status is reflected in such things as the general reputation the company has in the community and in the business world, especially within its own industry; the esteem which people have for its services or products.

14. (MOTIVATION TO ACHIEVE)--Reflects the degree to which the organization attempts to excel; the strength of its desire to be number one. A high rating reflects a lack of complacency even in the face of good profits, growth, etc.

15. (PRESSURE)--Degree to which the company almost constantly pushes its managers to get the work out. This push can be in the form of stringent timetables, harsh attitudes toward delays, the withholding of rewards or expectations on the part of the company that its managers show a great deal of "hustle."

16. (STATUS POLARIZATION)--Degree to which there are definite physical and psychological distinctions between managerial levels in the organization. Physical distinctions would include special privileges such as parking places and office decoration. Psychological

distinctions would includes informal social boundaries, subgroup formation, treatment of a subordinate as inferior, etc. In sum, it refers to the extent to which apparent differences are maintained between levels.

17. (INTELLIGENCE)--Ability of the organization to deal with changes and pressures outside the system, namely, from the environment; ability to foresee and adapt to changes, e.g., in the market, consumers, the parent organization, attitudes of the public, etc., and to adapt to these changes before they become critical problems. In essence, how "smart" is this organization?

18. (CONCERN WITH INTERNAL OPERATIONS)--Degree to which the organization is aware of and reacts to potential problems within the organization before they are critical. This factor is the converse of the previous factor. The concern and awareness covers internal operations such as efficiency, organization and planning, work scheduling, production problems, etc. The degree to which the organization keeps its house in order.

19. (FLEXIBILITY AND INNOVATION)--Willingness to try new procedures, to experiment with change. In contrast to the two preceeding factors, this is a willingness to experiment which is not really required due to some potential crisis situation, but rather to improve a situation or process which may be working satisfactorily now but could be improved. Also refers to the speed with which such changes are made.

20. (DECISION CENTRALIZATION)--Extent to which the organization delegates the responsibility for making decisions either as widely as possible or centralizes it as much as possible. Decentralization includes the idea of shared authority in decision making, so that the power is spread throughout the company rather than tightly held by the upper levels of management.

21. (ENVIRONMENTAL SEVERITY)--Degree to which working in this organization is risky, unstable, and difficult. That is, to do the job here a manager has to be willing to make decisions that are difficult and which carry serious consequences for judgmental errors; extent to which managerial positions are taxing, demanding, and difficult.

22. (KNOWLEDGE OF RESULTS)--Refers simply to how well the organization keeps managers informed about their job performance. There may be formal or informal means for doing this, but the question is how much feedback is given to managers about their job performance. Besides quantity, this dimension also refers to the quality of feedback, e.g., clarity and relevance.

Figure 4

Definitions of Clusters derived by the Ward and Hook Hierarchical Cluster Analysis Procedure for the Description of the Total Organization Climate

1. Task Structure. The degree to which the methods used to accomplish tasks are spelled out by the organization.

2. Reward/Performance Relationship. Reflects the degree to which the granting of additional rewards such as promotions and salary increases are based on performance and merit rather than other considerations such as seniority, favoritism, etc.

3. Decision Centralization. The extent to which decision making is reserved for top management.

4. Achievement Emphasis. The desire on the part of the people in the organization to do a good job and contribute to the performance of the organization.

5. Training and Development Emphasis. Degree to which the organization tries to support the performance of individuals through appropriate training and development experiences.

6. Security vs. Risk. Reflects the degree to which pressures in the organization lead to feelings of insecurity and anxiety.

7. Openness vs. Defensiveness. Degree to which people try to cover their mistakes and look good rather than communicate freely and cooperate.

8. Status and Morale. The general feeling among individuals that the organization is a good place in which to work.

9. Recognition and Feedback. Degree to which an individual knows what his supervisor and management think of his work and the degree to which they support him.

10. General Organizational Competence and Flexibility. The degree to which an organization knows what its goals are and pursues them in a flexible and innovative manner. Includes the extent to which it anticipates problems, develops new methods, and develops new skills in people before problems become crises.

Figure 5

Definitions of Clusters derived by the Ward and Hook Hierarchical Cluster Analysis Procedure for the Description of Work Group Climate

1. Task Structure. The degree to which the methods used to accomplish tasks are spelled out by the organization.

2. Reward/Performance Relationship. Reflects the degree to which the granting of additional rewards such as promotions and salary increases are based on performance and merit rather than other considerations such as seniority, favoritism, etc.

3. Decision Centralization. The extent to which decision making is reserved for top management.

4. Achievement Emphasis. The desire on the part of the people in the organization to do a good job and contribute to the performance of the organization.

5. Training and Development Emphasis. Degree to which the organization tries to support the performance of individuals through appropriate training and development experiences.

6. Security vs. Risk. Reflects the degree to which pressures in the organization lead to feelings of insecurity and anxiety.

7. Openness vs. Defensiveness. Degree to which people try to cover their mistakes and look good rather than communicate freely and cooperate.

8. Work Group Reputation. Reflects the status and reputation of the individual's work group as compared to other work groups.

9. Satisfaction and Morale. Reflects the general level of morale in the group.

10. Supportiveness. Degree to which the supervisory and other group members generate a supportive and friendly atmosp re.

11. Initial Job Orientation. Degree to which individuals are informed as to what to expect when they first start on the job.

12. Problem Solving Ability. Extent to which the work group can anticipate and solve problems related to group functioning.

13. Concern for Excellence. Degree to which the group is concerned with improving individual performance and being flexible, innovative, and competent.