Leadership and Decision Making

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Introduction

Several scholarly disciplines share an interest in the decision-making process. On one hand, there are related fields of operations research and management science, both concerned with how to improve the decisions which are made. Their models of decision making, aimed at providing a rational basis for selecting among alternative courses of action, are termed *normative* or *prescriptive* models. On the other hand, there have been attempts by psychologists, sociologists, and political scientists to understand the decisions and choices that people do make. March and Simon (1958) were among the first to suggest that an understanding of the decision-making process could be central to an understanding of the behavior of organizations—a point of view that was later amplified by Cyert and March (1963) in their behavioral theory of the firm. In this tradition, the goal is understanding rather than improvement, and the models are descriptive rather than normative.

Whether the models are normative or descriptive, the common ingredient is a conception of decision making as an information-processing activity, frequently one which takes place within a single manager. Both sets of models focus on the set of alternative decisions or problem solutions from which the choice is, or should be, made. The normative models are based on the consequences of choices among these alternatives, the descriptive models on the determinants of these choices.

In this article, the authors take a somewhat different, although complementary, view of managerial decision making. They view decision making as

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a social process, with the elements of the process presented in terms of events between people, rather than events that occur within a person. When a problem or occasion for decision making occurs within an organization, there are typically several alternative social mechanisms available for determining what solution is chosen or decision reached. These alternatives vary in the person or persons participating in the problem-solving and decision-making process, and in the relative amounts of influence that each has on the final solution or decision reached.

There are both descriptive and normative questions to be answered about the social processes used for decision making in organizations. The normative questions hinge on knowledge concerning the consequences of alternatives for the effective performance of the system. The dimensions on which social processes can vary constitute the independent variables, and criteria of the effectiveness of the decisions constitute dependent variables. Ultimately, such knowledge could provide the foundation for a specification of the social and interpersonal aspects of how decisions *should be* made within organizations.

Similarly, the descriptive questions concern the circumstances under which alternative social processes for decision making *are* used in organizations. The dimensions on which social processes vary become the dependent variables, and characteristics of the manager who controls the process and the nature of the decision itself provide the basis for the specification of independent variables.

Vroom and Yetton (1973) provided a start to an examination of both normative and descriptive questions through an examination of one dimension of decision making—the extent to which a leader encourages the participation of his subordinates in decision making. Participation in decision making was a logical place to start since there is substantial evidence of its importance and of the circumstances surrounding different consequences of it (Lowin, 1968; Vroom, 1970; Wood, 1973).

The purpose of this article is twofold: (1) to provide a brief summary of the objectives, methods, and results of the research pertaining to both normative and descriptive models of decision processes used in organizations (described in detail in Vroom and Yetton, 1973); (2) to describe some recent extensions of the previous work, including an empirical investigation designed to explore facets of decision making not previously studied.

Vroom and Yetton concern themselves primarily with problems or decisions to be made by managers with a formally defined set of subordinates reporting to them. In each problem or decision, the manager must have some area of freedom or discretion in determining the solution adopted, and the solution must affect at least one of the manager's subordinates. Following Maier, Solem, and Maier (1957), they further make a distinction between group problems and individual problems. If the solution adopted has potential effects on all immediate subordinates or some readily identifiable subset of them, it is classified as a group problem. If the solution affects only one of the subordinates, it is called an *individual problem.* This distinction is an important

one because it determines the range of decision-making processes available to ibe manager. Table 1 shows a taxonomy of decision processes for both types of problems. Each process is represented by a symbol (e.g., AI, CI, GII, DI), winch provides a convenient method of referring to each process. The letters in the code signify the basic properties of the process (A stands for autocratic; C for consultative; G for group; and D for delegated). The roman numerals that follow the letters constitute variants on that process. Thus, AI represents the first variant on an autocratic process; A11 the second variant, and so on.

The processes shown in Table 1 are arranged in columns corresponding to their presumed applicability to either group or individual problems and are arranged within columns in order of increasing opportunity for the subordinate to influence the solution to the problem.

The discrete alternative processes shown in Table 1 can be used both normatively and descriptively. In the former use, they constitute discrete alternatives available to the manager or decision maker, who presumably is motivated to choose that alternative which has the greatest likelihood of producing effective results for his organization. In the latter use, the processes constitute forms of behavior on the part of individuals which require explanation. In the balance of this paper, we will attempt to keep in mind these two •ses of the taxonomy and will discuss them separately.

Table 1 Decision-Making Processes

For individual Problems		For Group Problems	
M	You solve the problem or make the decision yourself, using information available to you at that time.	AI	You solve the problem or make the decision yourself, using information available to you at that time.
M1	You obtain any necessary information from the subordinate, then decide on the solution to the problem yourself. You may or may not tell the subordinate what the problem is, in getting the information from him. The role played by your subordinate in making the decision is clearly one of providing specific information which you request, rather than generating or evaluating alternative solutions.	All	You obtain any necessary information from subordinates, then decide on the solution to the problem yourself. You may or may not tell subordinates what the problem is, in getting the information from them. The role played by your subordinates in making the decision is clearly one of providing specific information which you request, rather than generating or evaluating solutions.
CI	You share the problem with the relevant subordinate, getting his ideas and suggestions. Then *you* make the decision. The decision may or may not reflect your subordinate's influence.	CI	You share the problem with the relevant subordinates individually, getting their ideas and suggestions without bringing them together as a group. Then *you* make the decision. This decision may or may not reflect your subordinates' influence.
G	You share the problem with one of your subordinates and together you analyze		

(continued)

the problem and arrive at a mutually satisfactory solution in an atmosphere of free and open exchange of information and ideas. You both contribute to the resolution of the problem with the relative contribution of each being dependent on knowledge, rather than formal authority.

Dl You delegate the problem to one of your subordinates, providing him with any relevant information that you possess, but giving him responsibility for solving the problem by himself. Any solution which the person reaches will receive your support.

Cll You share the problem with your subordinates in a group meeting. In this meeting you obtain their ideas and suggestions. Then *you* make the decision which may or may not reflect your subordinates' influence.

Gil You share the problem with your subordinates as a group. Together you generate and evaluate alternatives and attempt to reach agreement (consensus) on a solution. Your role is much like that of chairman; coordinating the discussion, keeping it focused on the problem, and making sure that the critical issues are discussed. You do not try to influence the group to adopt "your" solution and are willing to accept and implement any solution which has the support of the entire group.

A Normative Model of Decision Processes

What would be a rational way of deciding on the form and amount of participation in decision making to be used in different situations? Neither debates over the relative merits of Theory X and Theory Y (McGregor, 1960) nor the apparent truism that leadership depends on the situation are of much help here. The aim in this portion of the research is to develop a framework for matching a leader's behavior, as expressed in the alternatives presented in Table 1, to the demands of his situation. Any framework developed must be consistent with empirical evidence concerning the consequences of participation and be so operational that a trained leader could use it to determine how he should act in a given situation.

The normative model should provide a basis for effective problem solving and decision making by matching the desired decision process with relevant properties of particular problems or decisions to be made. Following Maier (1963), the effectiveness of a decision is thought to be a function of three classes of outcomes, each of which may be expected to be affected by the decision process used. These are:

1. **The quality or rationality of the decision.**
2. **The acceptance or commitment on the part of subordinates to execute the decision effectively.**
3. **The amount of time required to make the decision.**

Space prevents an exposition of the empirical evidence concerning the consequences of participation, but the reader interested in these questions is referred to Vroom (1970) and to Vroom and Yetton (1973, pp. 20-31) for a presentation of that evidence. Since the research program began, a number of normative models for choosing among alternative decision processes have been developed. Each revision is slightly more complex than its predecessor but, in the minds of both developers and users, also is more accurate in forecasting the consequences of alternatives. Most of these models have been concerned solely with group problems (the right-hand column in Table 1). In Vroom and Yetton (1973) virtually all of the discussion of normative models is oriented toward group problems; although, in their discussion of further revisions and extensions of the model, they discuss the possibility of a model for both individual and group problems and present a tentative model which governs choice of decision processes for both types.

Figure 1 shows the latest version of a model intended to deal with both types of problems. Like previous models, it is expressed in the form of a decision tree. Arranged along the top of the tree are a set of eight problem attributes, expressed here in the form of simple yes-no questions that a leader could ask himself about the decision-making situation he is presently confronting.[1] To use die model, one starts at the left-hand side of the tree and works toward the right-hand side, asking oneself the questions pertaining to any box that is encountered. When a terminal node is reached, a number will be found designating the problem type and one or more decision-making processes considered appropriate for that problem. Within each problem type there are both individual and group problems, and the feasible set of methods is different for each.

The decision processes specified for each problem type are not arbitrary. The specification of the feasible set of decision processes for each problem type is governed by a set of 10 rules that serve to protect the quality and acceptance of the decision by eliminating alternatives that risk one or the other of these decision outcomes. These rules, consistent with existing empirical evidence concerning the consequences of participation, are shown in Table 2 in both verbal and set-theoretic form. It should be noted that the rules are of three distinct types. Rules 1 through 4 are designed to protect the quality or rationality of the decision; Rules 5 through 8 are designed to protect the acceptance of or commitment to the decision; and Rules 9 through 10 eliminate the use of group methods for individual problems and vice versa. The decision tree is merely a convenient structure for applying these rules, and, once the problem type has been determined, the rules have all been applied. It can be seen that there are some problem types for which only one method remains in the feasible set, and others for which two, three, four, or even five methods remain in the feasible set.

When more than one method remains in the feasible set, there are a number of ways in which one might choose among them. One method, called Model A and discussed at length by Vroom and Yetton, uses the number of man-hours required by the process of decision making. They argue that

if the alternatives within the feasible set are equal in the probability of generating a rational decision which subordinates will accept, a choice among them based on the time requirement of each will be of maximum short-run benefit to the organization.

The basis for estimating the relative requirements in man-hours for the alternatives given for group problems is simple. Vroom and Yetton argue that

A. Is there a quality requirement such that one solution is likely to be more rational than another?
B. Do I have sufficient info to make a high-quality decision?
C. Is the problem structured?
D. Is acceptance of decision by subordinates critical to effective implementation?
E. If I were to make the decision by myself, is it reasonably certain that it would be accepted by my subordinates?
F. Do subordinates share the organizational goals to be attained in solving this problem?
G. Is conflict among subordinates likely in preferred solutions? (This question is irrelevant to individual problems.)
H. Do subordinates have sufficient info to make a high-quality decision?

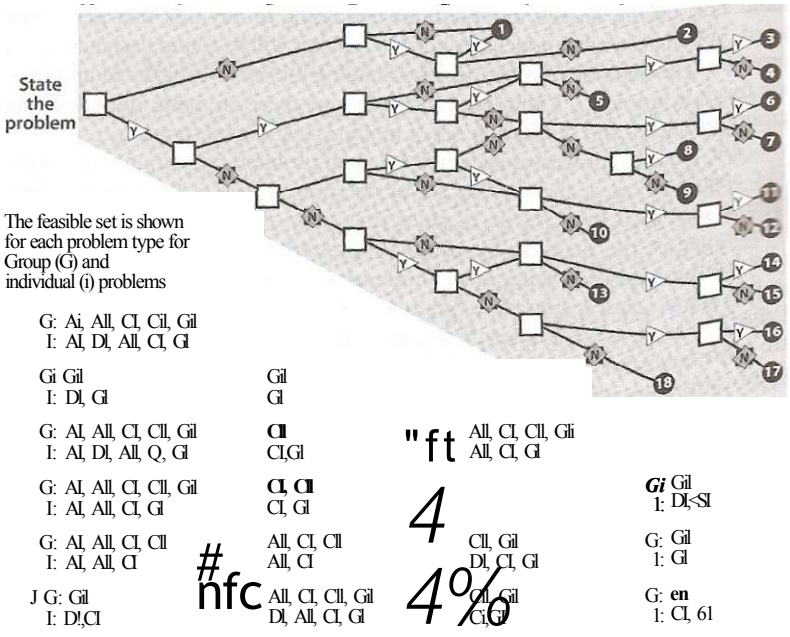

Figure 1 Decision-Process Flow Chart for Both Individual and *Gf*$^{(if)}$

Table 2 Rules Underlying the Normative Model

1. The Leader Information Rule: *AnB-> AI*
If the quality of the decision is important and the leader does not possess enough information or expertise to solve the problem by himself, then AI is eliminated from the feasible set.

2. The Subordinate Information Rule: *Ar>H ->DI* (applicable to individual problems only)
If the quality of the decision is important and the subordinate does not possess enough information or expertise to solve the problem himself, then Dl is eliminated from the feasible set.

3a. The Goal Congruence Rule: *AnF ->GII,DI*
If the quality of the decision is important and the subordinates are not likely to pursue organization goals in their efforts to solve this problem, then Gil and Dl are eliminated from the feasible set.

3b. The Augmented Goal Congruence Rule: A n (D n f) n F ***->GI*** (applicable to individual problems only)
Under the conditions specified in the previous rule (i.e., quality of decision is important, and the subordinate does not share the organizational goals to be attained in solving the problem) Gl may also constitute a risk to the quality of the decision taken in response to an individual problem. Such a risk is a reasonable one to take only if the nature of the problem is such that the acceptance of the subordinate is critical to the effective implementation and prior probability of acceptance of an autocratic solution is low.

4a. The Unstructured Problem Rule (Group): *AnBnC AI, All,CI*
In decisions in which the quality of the decision is important, if the leader lacks the necessary information or expertise to solve the problem by himself and if the problem is unstructured, the method of solving the problem should provide for interaction among subordinates. Accordingly, AI, Aii, and CI are eliminated from the feasible set.

4b. The Unstructured Problem Rule (Individual): *AnB* nC *AI.AII*
In decisions in which the quality of the decision is important, if the leader lacks the necessary information to solve the problem by himself and if the problem is unstructured, the method of solving the problem should permit the subordinate to generate solutions to the problem. Accordingly, AI and All are eliminated from the feasible set.

5. The Acceptance Rule: *DnE AI.AII*
If the acceptance of the decision by subordinates is critical to effective implementation and if it is not certain that an autocratic decision will be accepted, AI and All are eliminated from the feasible set.

6. The Conflict Rule: *DnE* nG -» *AI,AII,CI* (applicable to group problems only)
If the acceptance of the decision is critical, an autocratic decision is not certain to be accepted, and disagreement among subordinates in methods of attaining the organizational goal is likely, the methods used in solving the problem should enable those in disagreement to resolve their differences with full knowledge of the problem. Accordingly, AI, All, and CI, which permit no interaction among subordinates, are eliminated from the feasible set.

(continued)

7. The Fairness Rule: ***Ac\Dr\E -> AI,AII,a,OI***
If the quality of the decision is unimportant, but acceptance of the decision is critical and not certain to result from an autocratic decision, the decision process used should permit the subordinates to interact with one another and negotiate over the fair method of resolving any differences with full responsibility on them for determining what is equitable. Accordingly, AI, All, CI, and CM are eliminated from the feasible set.

8. The Acceptance Priority Rule: ***DnEr\F~> AI,AII,CI,CII***
If acceptance is critical, not certain to result from an autocratic decision and if (the) subordinate(s) is (are) motivated to pursue the organizational goals represented in the problem, then methods which provide equal partnership in the decision-making process can provide greater acceptance without risking decision quality. Accordingly, AI, All, CI, and Cll are eliminated from the feasible set.

9. The Group Problem Rule: ***Group Gl.Dl***
If a problem has approximately equal effects on each of a number of subordinates (i.e., is a group problem) the decision process used should provide them with equal opportunities to influence that decision. Use of a decision process, such as Gl or Dl, which provides opportunities for only one of the affected subordinates to influence that decision, may in the short run produce feelings of inequity reflected in lessened commitment to the decision on the part of those "left out" of the decision process and, in the long run, be a source of conflict and divisiveness.

10. The Individual Problem Rule: ***Individual Cll,Gil***
If a problem affects only one subordinate, decision processes which unilaterally introduce other (unaffected) subordinates as equal partners constitute an unnecessary use of time of the unaffected subordinates and can reduce the amount of commitment of the affected subordinate to the decision by reducing the amount of his opportunity to influence the decision. Thus, Cll and Gil are eliminated from the feasible set.

more participative processes require more time. Therefore, the ordering of the methods shown for group problems in terms of man-hours is perfectly correlated with the degree of participation they permit (AI<AII<CICII<GII). However, the extension of the model to cover individual problems complicates this picture, since the decision process which provides greatest opportunity for subordinate influence, Dl, is certainly less time consuming than GI, which requires reaching a solution that has the agreement of both superior and subordinate. While the differences in time requirements of the alternatives for individual problems is not nearly so great as the differences in the alternatives for group problems, we have assumed an ordering such that AI<DI<AII<CI<GI. The reader will note that the ordering of alternatives from left to right within the feasible sets for each problem type in Figure 1 reflects this assumption. Thus, for both group and individual problems, the minimum-man-hours solution is assumed to be the alternative furthest to the left within the feasible set.

There are, however, other bases for choice within the feasible set. A manager may wish to choose the most participative alternative that can be used while still producing rational and acceptable solutions to organizational prob-

lems. Such a position could be grounded in humanistic considerations, emphasizing the intrinsic value of participation, or on pragmatic considerations, such as the utility of participation in developing informed and responsible behavior (Vroom and Yetton, 1973). A model based on these considerations is termed *Model B.*

The reader should note that both Models A and B are consistent with the rules which generate the feasible set. They merely represent different bases for choice within it. Model A chooses the method within the feasible set which is the most economical method in terms of man-hours. Its choice is always the method furthest to the left in the set shown in Figure 1. Model B chooses the most participative method available within the feasible set, which is that method closest to the bottom of Table 1. Model A seeks to minimize man-hours, subject to quality and acceptance constraints, while Model B seeks to maximize participation, subject to quality and acceptance constraints. Of course, when only one process exists within the feasible set, the choices of Model A and B are identical. Perhaps the best way of illustrating the model is to show how it works in sample situations. Following are a set of actual leadership problems,[2] each based on a retrospective account by a manager who experienced the problem. The reader may wish, after reading each case, to analyze it himself using the model and then to compare his analysis with that of the authors.

Case I. You are president of a small but growing midwestern bank, with its head office in the state's capital and branches in several nearby market towns. The location and type of business are factors which contribute to the emphasis on traditional... and conservative banking practices at all levels.

When you bought the bank five years ago, it was in poor financial shape. Under your leadership, much progress has been made. This progress has been achieved while the economy has moved into a mild recession, and, as a result, your prestige among your bank managers is very high. Your success, which you are inclined to attribute principally to good luck and to a few timely decisions on your part, has, in your judgment, one unfortunate by-product. It has caused your subordinates to look to you for leadership and guidance in decision making beyond what you consider necessary. You have no doubts about the fundamental capabilities of these men but wish that they were not quite so willing to accede to your judgment.

You have recently acquired funds to permit opening a new branch. Your problem is to decide on a suitable location. You believe that there is no "magic formula" by which it is possible to select an optimal site. The choice will be made by a combination of some simple common-sense criteria and "what feels right." You have asked your managers to keep their eyes open for commercial real estate sites that might be suitable. Their knowledge about the communities in which they operate should be extremely useful in making a wise choice.

Their support is important because the success of the new branch will be highly dependent on your managers' willingness to supply staff and technical

assistance during its early days. Your bank is small enough for everyone to feel like part of a team, and you feel that this has been and will be critical to the bank's prosperity.

The success of this project will benefit everybody. Direcdy, they will benefit from the increased base of operations, and, indirectly, they will reap the personal and business advantages of being part of a successful and expanding business.

Analysis:		Synthesis:	
A	(Quality?) = Yes	Problem type	14-Group
B	(Leader's information?) = No	Feasible set	c n , G n
C	(Structured?) = No	Model A behavior	CII
D	(Acceptance?) - Yes	Model B behavior	Gil
E	(Prior probability of acceptance?) = Yes		
F	(Goal congruence?) = Yes		
G^3	(Conflict?) = No		
H^3	(Subordinate information?) = Yes		

Case II. You are regional manager of an international management consulting company. You have a staff of six consultants reporting to you, each of whom enjoys a considerable amount of autonomy with clients in the field.

Yesterday you received a complaint from one of your major clients to the effect that the consultant whom you assigned to work on the contract with them was not doing his job effectively. They were not very explicit about the nature of the problem, but it was clear that they were dissatisfied and that something would have to be done if you were to restore the client's faith in your company.

The consultant assigned to work on that contract has been with the company for six years. He is a systems analyst and is one of the best in that profession. For the first four or five years his performance was superb, and he was a model for the other more junior consultants. However, recently he has seemed to have a "chip on his shoulder," and his previous identification with the company and its objectives has been replaced with indifference. His negative attitude has been noticed by other consultants, as well as by clients. This is not the first such complaint that you have had from a client this year about his performance. A previous client even reported to you that the consultant reported to work several times obviously suffering from a hangover and that he had been seen around town in the company of "fast" women.

It is important to get to the root of this problem quickly if that client is to be retained. The consultant obviously has the skill necessary to work with the clients effectively. If only he were willing to use it!

Analysis:		Synthesis:	
A	(Quality?) = Yes	Problem type	18-Individual
B	(Leader's information?) = No	Feasible set	CI, GI
C	(Structured?) = No	Model A behavior	CI
D	(Acceptance?) — Yes	Model B behavior	GI

E (Prior probability of acceptance?) = No
F (Goal congruence?) = No
H^3 (Subordinate information?) = Yes

Case HI. You have recendy been appointed manager of a new plant which is presently under construction. Your team of five department heads has been selected, and they are now working with you in selecting their own staffs, purchasing equipment, and generally anticipating the problems that are likely to arise when you move into the plant in three months.

Yesterday, you received from the architect a final set of plans for the building, and, for the first time, you examined the parking facilities that are available. There is a large lot across the road from the plant intended primarily for hourly workers and lower-level supervisory personnel. In addition, there are seven spaces immediately adjacent to the administrative offices, intended for visitor and reserved parking. Company policy requires that a minimum of three spaces be made available for visitor parking, leaving you only four spaces to allocate among yourself and your five department heads. There is no way of increasing the total number of such spaces without changing the structure of the building.

Up to now, there have been no obvious status differences among your team, who have worked together very well in the planning phase of the operation. To be sure, there are salary differences, with your administrative, manufacturing, and engineering managers receiving slightly more than the quality control and industrial relations managers. Each has recently been promoted to his new position and expects reserved parking privileges as a consequence of his new status. From past experience, you know that people feel strongly about things which would be indicative of their status. So you and your subordinates have been working together as a team, and you are reluctant to do anything which might jeopardize the team relationship.

Analysis:	Synthesis:	
A (Quality?) = No	Problem type	2-Group
D (Acceptance?) = Yes	Feasible set	Gil
E (Prior probability of acceptance?) = No	Model A behavior	Gil
	Model B behavior	Gil
G^3 (Conflict?) = Yes		

Case IV. You are executive vice president for a small pharmaceutical manufacturer. You have the opportunity to bid on a contract for the Defense Department pertaining to biological warfare. The contract is outside the mainstream of your business; however, it could make economic sense since you do have unused capacity in one of your plants, and the manufacturing processes are not dissimilar.

You have written the document to accompany the bid and now have the problem of determining the dollar value of the quotation which you think

will win the job for your company. If the bid is too high, you will undoubtedly lose to one of your competitors; if it is too low, you would stand to lose money on the program.

There are many factors to be considered in making this decision, including the cost of the new raw materials and the additional administrative burden of relationships with a new client, not to speak of factors which are likely to influence the bids of your competitors, such as how much they *need* this particular contract. You have been busy assembling the necessary data to make this decision but there remain several "unknowns," one of which involves the manager of the plant in which the new products will be manufactured. Of all your subordinates, only he is in the position to estimate the costs of adapting the present equipment to their new purpose, and his cooperation and support will be necessary in ensuring that the specifications of the contract will be met.

However, in an initial discussion with him when you first learned of the possibility of the contract, he seemed adamantly opposed to the idea. His previous experience has not particularly equipped him with the ability to evaluate projects like this one, so you were not overly influenced by his opinions. From the nature of his arguments, you inferred that his opposition was ideological, rather than economic. You recall that he was actively involved in a local "peace organization" and, within the company, was one of the most vocal opponents to the war in Vietnam.

Analysis:		Synthesis:	
A	(Quality?) = Yes	Problem type	8- or 9-Individual
B	(Leader's information?) = No	Feasible set	CI, GI
C	(Structured?) = Yes	Model A behavior	CI
D	(Acceptance?) = Yes	Model B behavior	GI
E	(Prior probability of acceptance?) = No		
F	(Goal congruence?) — No		
H^3	(Subordinate information?) = No		

Toward a Descriptive Model

So far, we have been concerned only with normative or prescriptive questions. But, how do managers really behave? What decision rules underlie their willingness to share their decision-making power with their subordinates? In what respects are these decision rules similar to or different from those employed in the normative model?

The manner in which these questions are posed is at variance with much of the conventional treatment of such issues. Frequently, leaders are typed as autocratic or participative or as varying on a continuum between these extremes. In effect, autocratic or participative behavior is assumed to be controlled by a personality trait, the amount of which varies from one person to another. The trait concept is a useful one for summarizing differences among

people but allows no room for the analysis of intra-individual differences in behavior. Following Lewin's (1951) classic formation $B = f(P,E)$, we assumed that a leader's behavior in a given situation reflects characteristics of that leader, properties of the situation, and the interaction of the two.

Two somewhat different research methods have been used in studying the situational determinants of participative behavior. The first method (Vroom and Yetton, 1973, chapter 4) utilized what we have come to refer to as "recalled problems." Over 500 managers, all of whom were participants in management development programs, provided written descriptions of a group problem which they encountered recently. These descriptions ranged in length from one paragraph to several pages and covered virtually every facet of managerial decision making. Each manager was then asked to indicate which of the methods shown on the right-hand side of Table 1 (AI, All, CI, CII, Gil) he had used in solving the problem. Finally, each manager was asked a set of questions concerning the problem he had selected. These questions corresponded to attributes in the normative model.

Preliminary investigation revealed that managers perceived the five alternatives as varying (in the order shown in Table 1) on a scale of participation, but that the four intervals separating adjacent processes were not seen as equal. On the basis of the application of several scaling methods (Vroom and Yetton, 1973, pp. 65-71), the following values on a scale of participation were assigned to each process: AI = 0; AH = .625; CI = 5.0; CII = 8.125; GH = 10.

Using the managers' judgments of the status of the problems they described on the problem attributes as independent variables and the scale values of their behavior on the problem as a dependent variable, it is possible to use the method of multiple regression to determine the properties of situations (i.e., problems), which are associated with autocratic or participative behavior. It is also possible to insert the managers' judgments concerning their problems into the normative model and to determine the degree of correspondence between managerial and model behavior.

Several investigations have been conducted using this method—all of which have been restricted to group problems and the decision processes corresponding to them. The results are consistent with the view that there are important differences in the processes used for different kinds of problems. Specifically, managers were more likely to exhibit autocratic behavior on structured problems in which they believed that they had enough information, their subordinates lacked information, their subordinates' goals were incongruent with the organizational goals, their subordinates' acceptance of the decision was not critical to its effective implementation, and the prior probability that an autocratic decision would be accepted was high. Thus, many (but not all) of the attributes contained in the normative model had an effect on the decision processes which managers employed, and the directions of these effects are similar to those found in the model. However, it would be a mistake to conclude that the managers' behavior was always identical to that of the model. In approximately two-thirds of the problems, never-

theless, the behavior which the manager reported was within the feasible set of methods prescribed for that problem, and in about 40 percent of the cases it corresponded exactly to the minimum man-hours (Model A) solution.

Several observations help to account for differences between the model and the typical manager in the sample. First, as is apparent from an inspection of Figure 1, the normative model incorporates a substantial number of interactions among attributes, whereas no such interactions appeared in the results of the regression analysis. Second, the magnitude of the effects of two attributes pertaining to the acceptance or commitment of subordinates to decisions was considerably weaker in the descriptive than in the normative model, suggesting that these considerations play less of a role in determining how people behave. This inference was further supported by the fact that rules designed to protect the acceptance of the decision in the normative model were violated far more frequently than rules designed to protect decision quality.

The results of this research were supportive of the concept of intrapersonal variance in leadership style and helped to identify some of the situational factors influencing leaders' choices of decision processes. There were, however, some key methodological weaknesses to this research. Limited variance in and intercorrelations among the problem attributes restricted the extent to which situational effects could be determined with precision. Furthermore, the fact that subjects selected and scored their own problems may have led to confounding of individual differences and situational effects. Finally, since only one problem was obtained from each manager, it was impossible to identify interactions between person and situational variables (i.e., idiosyncratic rules for deciding when and to what extent to encourage participation by subordinates).

The methodological problems inherent in the use of "recalled problems" dictated a search for another method with which to explore the same phenomenon. The technique selected involved the development of a standardized set of administrative problems or cases, each of which depicted a leader faced with some organizational requirement for action or decision making. Managers were asked to assume the role of leader in each situation and to indicate which decision process they would employ.

Several standardized sets of cases were developed, using rewritten accounts of actual managerial problems obtained from the previous method. These sets of cases, or problem sets, were developed in accordance with a multi-factorial experimental design, within which the problem attributes were varied orthogonally. Each case corresponded to a particular combination of problem characteristics, and the entire set of cases permitted the simultaneous variation of each problem attribute. To ensure conformity of a given case or problem with the specifications of a cell in the experimental design, an elaborate procedure for testing cases was developed (Vroom and Yetton, 1973, pp. 97-101), involving coding of problems by expert judges and practicing managers.

This method showed promise of permitting the replication of the results using recalled problems with a method that avoided spurious effects stemming from the influence of uncontrolled variables on problem selection. Since the use of a "repeated measures design" permitted a complete experiment to be performed on each subject, the main effects of each of the problem attributes on the decision processes used by the subject could be identified. By comparing the results for different subjects, the similarities and differences in these main effects and the relative importance of individual differences and of situational variables could be ascertained.

Vroom and Yetton worked exclusively with group problems and with an experimental design which called for 30 cases. The results, obtained from investigations of eight distinct populations comprising over 500 managers, strongly support the major findings from the use of recalled problems, both in terms of the amount of correspondence with the normative model and the specific attributes of situations which tended to induce autocratic and participative decision processes. Moreover, the nature of the methods used made it possible also to obtain precise estimates of the amount of variance attributable to situational factors and individual differences. Only 10 percent of the total variance could be accounted for in terms of general tendencies to be autocratic or participative (as expressed in differences among individuals in mean behavior on all 30 problems), while about 30 percent was attributable to situational effects (as expressed in differences in mean behavior among situations).

What about the remaining 60 percent of the variance? Undoubtedly, some of it can be attributed to errors of measurement, but Vroom and Yetton were able to show that a significant portion of that variance can be explained in terms of another form of individual differences (i.e., differences among managers in ways of "tailoring" their approach to the situation). Theoretically, these can be thought of as differences in decision rules that they employ concerning when to encourage participation.

Notes

For a detailed definition of these attributes and of criteria to be used in making Yes-No judgments, see Vroom and Yetton (1973, pp. 21-31).

[2] For additional problems and their analysis, see Vroom and Yetton (1973, pp. 40-44).

[3] The question pertaining to this attribute is asked in the decision tree but is irrelevant to the prescribed behavior.

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