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A THEORY OF DECISION-MAKING \*

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(1972)

I

Introduction

In a separate article, it has been stated:

The kinds of theories which social scientists have been able to construct have largely been dependent on the level or the degree of inference which the researchers have been able to draw from observations or experimental designs (which may or may not reflect the empirical world), and the assumptions upon which these inferences rest (Basu and Kenyon, 1972:425).

Notably, in the past three decades the eventual "success" of a theory has been tested on this basis. A major underlying premise in the ideographic science has been that cause and effect represent the methodological level of inquiry, however "singularizing" (as opposed to nomothetic "generalizing" science) the social "experience" may be. These relationships are either asymmetric, assuming an independent-dependent variable dichotomy, or symmetric, i.e. constructing theory on the basis of an interdependent, reciprocal causation inference. These analytic frames have attempted to explain what Durkheim has called "social facts." However, the problems of limitation of such a search in the development and finally application of a social theory using causal inferences as methodological guidelines have come to light, specifically in the area of policy-planning and decision-making.

It is the purpose of this paper to attempt to extend theory (specifically that applying to policy-planning and decision-making) from these limitations. The author will propose a theory of decision-making and will suggest its applications.

Literature on Decision-Making

The beginning of any major theory of bureaucratic behavior was instituted by Max Weber, the German sociologist. Weber represented the structuralist approach to the study of administration, in which the organization was seen as a large complex unit in which many social groupings interact under a system of shared goals. Incompatible interests were reconciled by a preconceived set of organizational values (i.e. efficiency) (Etzioni, 1964:21). Traditionally, forms of power had been in terms of rulers who maintained legal dominance or charismatic leaders who gained influence through the personal identification of their followers. Weber saw administrative behavior as a product of preconceived role and status positions, carrying with them expected modes of behavior established by fixed rules and regulations (Etzioni, 1964:51).

First, there were fixed jurisdictional areas established by ordered rules. These established the sphere of one's duties. Second, there was an established hierarchy of functions and leadership establishing one's

status and role position. A person behaved in terms of expected modes of action within his status and sphere of influence. The basis of these organizational arrangements was written documents. Expertise was assumed for members functioning within the organization. The principle of expertise was specialization (Weber, 1965).

The structuralist approach viewed decision-making as a function of "compliance with" a fixed set of organizational structured arrangements, and a predetermined set of goals for the organization (Etzioni, 1961). The approach is still maintained in many studies of administrative behavior. The most prominent exponent of a fixed set of structural arrangements and the decision process is Luther Gulick (Gulick, 1954).

Since Weber, other theorists have expanded the theory of decision-making by constructing rational models (experimental) based on the concepts of utility and maximization of goals and minimization of losses. These concepts were first developed by Bentham and Mill and later adopted by various economists in order to explain possible combinations of decision-making. These models attempt to simulate what actually occurs in decision processes. Basically, they fall into three categories: decision under certainty, decision under risk, and decision under uncertainty (Taylor, 1965:48-85).

Each of these rational models assumes no change in alternatives and outcomes. Information and choices are static. A more pragmatic view of decision-making evolved largely as a result of the Gestalt theories that, ". . . the presentation of a problem creates a psychic field of tension or stress, giving rise to processes which eventually lead to solution" (Taylor, 1965:71). Under this view, decision-makers are not given a set of alternatives to maximize a given set of goals. Instead, they must search for a set of alternatives until they find one which will satisfy their values (Taylor, 1965:56). In order to achieve consistency between the two, values and alternatives are not fixed, but exist in a dynamic relationship.

The above models of rational action are set in the context of a static experimental situation which may or may not be subject to empirical verification. Assuming a more dynamic theory, Simon, in his Administrative Behavior (Simon, 1958), developed the concept of man as neither rational nor irrational. Man acts in terms of "bounded rationality," or a limited knowledge of any one set of alternatives. The second assumption is that means and ends are not separate, but intertwined. Goals are constantly changing and therefore many alternatives in decision-making also change. The means which decisions take in turn affect the ends. This leads to the third assumption, that man's cognitive mechanisms function as a result of his affect processes (values). It is for this reason that it is important to study decision-making using empirical observation.

According to Simon, decision-makers continually search for a set of alternatives which are "good enough" to satisfy his values at a particular time. Decision-makers follow this course because of their limited knowledge (bounded rationality) of alternatives and consequences. Behavior is therefore not limited to a set of alternatives and fixed needs, but can be expanded to various levels of aspirations and short term behavior to satisfy needs at a particular time (Simon, 1957:246-256).

Lindblom extends the concept of limited rationality and cognition based on affect, by maintaining that a decision-maker chooses among values and alternatives at one and the same time. In other words, a choice of policy is in effect a choice of value. In addition, an administrator, rather than being aware of an infinite number of alternatives, focuses his attention on marginal or incremental values. For example, two policies promise the same degree of attainment of objectives A, B, C, D, and E. One policy, however, offers more of E than D, the other more of D than E. Rather than analyze all objectives and alternatives, a decision-maker chooses only between a part of a set of objectives. In choosing two values, he also determines his policy. In addition, policy is not made once and for all, but remade endlessly as values change, or as policies become incongruent with values (Lindblom, 1963).

Lindblom, in his The Intelligence of Democracy, extends his concepts of decision-making behavior by developing a number of models in which behavior is carried on in terms of mutual adjustments. If an agency is to implement its goals, it must adjust to the demands of other individuals by altering both means and ends (Lindblom, 1965:35-83).

Lindblom's general theory is that all "legislators, executives, agencies, interest group leaders, and party leaders constantly engage in partisan mutual adjustment with each other, both bilaterally and multilaterally in all possible combinations, . . . in order to gain desired ends" (Lindblom, 1965:98). There are a multitude of independent decision-makers interacting in a limited sphere on the basis of incremental calculations of what policy should be implemented. An incremental system in this fashion reduces the range of investigations and adaptations of any one decision-maker.

Davis (1966), and Wildavsky (1964), using an analytic method, made a study of the budgetary process in Washington, and devised a theory of how decisions are made. The budget is never reviewed by an agency possessing a large span of authority. Instead, each agency fights for itself in acquiring funds. It is as fragmented and narrow as the congressional committees that review it. Calculations for gain are based on the roles of the differing agencies, or rather the expectations of all who are competing. Each agency is competing in a bargaining arena; each has its own base of support. An agency will consider the political environment, its position in the bureaucracy, its support or lack of it from constituents and interest groups, and the expectations of congressional committees. They consider the effects of their proposals on other agencies only as they relate to them. Decision-making is thus fragmented by a multitude of interaction possibilities within a decision-making sphere.

Decision-making in governmental bureaucracy has traditionally been approached through descriptive analysis in a sphere of behavior. Simon (1957), and Lindblom (1965), have altered the original assumptions of rational theorists by constructing theories of bounded rationality and incremental behavior; however, decision-makers are still described and analyzed as existing apart from many conditions related to human behavior. Davis (1966), and Wildavsky (1964), are representative of present views of decision-making, but are limited to a sphere of political negotiation. Their assumption is that social conditions may affect a governmental process, but in an operative process of decision-making the two are separate. It is

the premise of this paper that a transactional theory of decision-making must include overlapping levels of both the social (external) and political (internal) units of behavior if the process of decision-making is to be understood. In order to achieve this, the level of analysis must be expanded to relate to the level of inference drawn from empirical observations. Furthermore, the operation and assumptions of causal inference which will form the cornerstone of the transactional theory of decision-making need to be reviewed and evaluated. Taken together, such will be the basic tenets of the transactional theory of decision-making as proposed in this paper.

## II

### Causal Inference

The basic conditions for establishing a causal relationship are that two variables exhibit concomitant variation, that one variable is prior to a second phenomenon, and that all other variables which might affect the original relationship are controlled for and eliminated (Seltiz et al., 1964: 422). Blalock, in making a distinction between causal inference and mathematical prediction, maintains that causal inference, in order to be valid, must be asymmetric (i.e., if X is a cause of Y, then it cannot be inferred that Y is a cause of X). A pure interdependent relationship whereby both variables cause each other is logically impossible to infer because of causal priority. When it is inferred, it represents a confusion between mathematical tests which may be symmetric and causal inference. Causation is a result of production forcings which produce changes. These can be empirically observed and measured. The inference of causation cannot. As Blalock states:

The inclusion of the notion of production forcings introduces asymmetry into the relationship between cause and effect, though we may also handle instances of what might be termed reciprocal causation (Blalock, 1964:10).

The phenomenon could be constructed as a linear model in the following manner: production forcings  $\rightarrow$  properties  $\rightarrow$  response.

Scientists (Rosenberg, 1968:3-22) tend to look on causal models as symmetric (functional interdependent variables) simply because they confuse causal inference with prediction and regression equations. These are mathematical checks, not inferences from empirical observation. One can predict from the dependent variable to the independent variable and conversely. This is a statistical phenomenon, just like regression analysis (test mean value of Y for each value of X). Causation, however, cannot be verified in this manner. As Kenneth Polk maintains, regression equations are measures of correlation coefficients, whereas causal relationships are established only by the researcher's theoretical knowledge of the nature of the variables. They must of necessity show causal priority, a phenomenon which cannot exist symmetrically (Polk, 1962:539-542).

Symmetric causal inference depends on two variables revealing a concomitant variation in regression analysis. X and Y both vary in value one to the other and vice versa along a regression scale. Any variation in one causes a variation in the other. If one accepts the arguments of Blalock

and Polk, then this phenomenon, even though statistically possible, is impossible in terms of causal inference due to the priority concept. The closest asymmetric causation comes to symmetry is in the case of reciprocal causality. This is a case whereby X causes Y, which in a sequential progression becomes an independent variable affecting X (as in the case of feedback in systems analysis). This is revealed by using different time intervals for describing any set of variables as dependent or independent. Causal priority still logically exists (Blalock, 1964:56).

Additional problems of causal inference lie in a researcher's ability to control all variables which may alter the original relationship. Further, causal inference is limited by assumptions concerning which variables are relevant. From these problems, one can reveal four types of causal relationships leading to multiple causation or causal monism, whereby an entire system is explained in an endless chain of multiple causal progressions and interrelationships. The first type is a single causation in which independent variable X causes an effect in dependent variable Y, all other variables controlled. The second concerns latent variables which are potential causes of Y, along with X, given certain conditions which at this point do not vary with Y. The third represents variables unrelated to X having an effect on Y, X being just one independent variable. The fourth represents variables systematically related to X, which affects the relationship X--Y. X may be contingent on other variables or an indirect cause of Y through other variables producing a change in Y (Blalock, 1960: 337-342).

The methods used to infer a causal system are many and varied. One concept of causal inference is typical analysis (McQuitty, 1961:71-78; Basu and Kenyon, 1972). In this process, variables resembling each other in attributes are grouped together in a category in order to visualize their relationship to each other and a separate attribute they have in common. This attribute, or criterion of choice, is thought to be related significantly to a third concept, or the independent variable. The property which the variables have in common, it can be inferred, yields a causal relationship simply by process of eliminating those things which they do not share in common. The fallacy is that qualitative and quantitative measurements of attributes possessed across all persons yields a correlation, not a cause, since variables may have undisclosed extraneous attributes in common (Kaplan, 1964:50-51; McCormick, 1952:35).

Another concept of causal inference used by Angus Campbell is the concept of a funnel of causation. Events follow each other in an inter-related fashion finally converging in a funnel, all extraneous variables being eliminated. This provides a single linear chain of causality in which only the variables which are directly relevant to any given event explain any one phenomenon. Campbell begins with a unidimensional analysis of two variables, revealing a cause and effect relationship. As the one-to-one relationships grow in number, they can be analyzed and eliminated as they converge into the funnel of explanation for any given event, (i.e. voting). Measurement of variables is restricted to their effect at any given point in time. The scope of theory then is restricted to its explanation of an event over time. "Exogenous" factors and relevant conditions are seen only as they exist in one form or another, never as a process of

changing relationships (even though exogenous factors may become relevant conditions given other conditions (Campbell, Converse, Miller and Stokes, 1960:24-26).

### III

#### Transactional Theory of Decision-Making: External vs. Internal

Causal priorities concerned with decision-making have been constructed either in an administrative vacuum, describing rational decision-making in terms of organizational properties (Presthus, 1963) and probabilistic outcomes of fixed alternatives of behavior, or they have drawn mere symmetric causal associations with external properties affecting internal (political) decision-making (Lindblom, 1965). However, the limitations of such theories are that the formal social (external) and political (internal) processes of decision-making are not accounted for.

If decision-making is to be understood within the context of an action-process which involves the larger society, then theory must be expanded. Decision-making is not a segregated, formalized phenomenon. It is an action which has consequences for the political process and the society which receives it.

The first assumption of the transactional theory of decision-making is the existence of decision-makers and actors outside the immediate administrative apparatus. Second, there is a number of interdependent hierarchies involved in the internal process. Legitimization of such an authority forms the political indices (e.g. power) of administrative behavior (Merton, 1962: 267). A third assumption is the incremental convergence of parameters over time  $\left(\frac{\Delta E}{\Delta t}\right)$ .

The transactional theory examines decision-making from a cause and effect framework which is based on an appreciation of asymmetric causation which leads to a formal synthesis, the original relationship being only a causal point in time. This assumption that cause and effect refer only to a point in time emphasizes that one variable does not continually cause a like effect in another variable. This concept is basic to this theory. The progression is from act  $\rightarrow$  action  $\rightarrow$  reaction  $\rightarrow$  transaction. An act is defined as conditions determining the allocation of decisions for society which is regulated by value, status, role, and a set of norms or generalized expectations for any given actor. The parameters of an act are the amount of resources that any decision-maker has at his disposal.

Action is the operational manifestation of an act, or the opportunity to use one's resources on the basis of indices determining the act. Action then, is the attempt to allocate resources through the political process. Reaction concerns the effect any given action will have on other actors. It involves social indices of behavior. All variables which will be involved are then put into active interrelationship (i.e. latent variables will now be actions).

Transaction represents the synthesis of action and reaction over time, or the constant resolution of the political and the social forces. In this relationship acts, actions, and reactions are in the process of behavioral

modifications. The end result is negotiation formulating a decision through the resolution at any point in time of actions. Such a confluence depicts this synthesis of acts through action and reaction leading to transaction.

The transactional theory, as proposed here, delineates two sets of parameters. The first is the internal context. This parameter consists of the decision-maker's political environment--such as fixed roles, norms, and administrative resource allocations. The second parameter is the decision-maker's role as a subject-participant in the societal processes (external), as he determines the view of the voters, interest groups, civic groups, and others. The parameters of this population are essentially social and cultural determinants. Within the variations of such reciprocal negotiations (transaction) decisions are formulated. Hence, to the extent that a particular act is transformed through action (political-internal) and reaction (social-external), decision-making takes place. It is transactional. One does not exist without the other. The greater the variance between the two (internal-external), the greater the possibility of the decision being misunderstood. Our basic concern then is not the establishment of the causal 'time' sequence between the two parameters, but the measurement of change in strength and quality of characteristics and relationships.

In order not to get "bogged" down in a semantic swamp of act, action, and reaction, it will be necessary to exemplify the theoretical framework. For further explanation of this theory, the concept of power structure will be helpful. Several community studies reveal a multitude of internal and external forces which determine decisions. The most inclusive is Edward Banfield's study of six civic controversies in Chicago. In this structure of decision-making there were many individuals operating in groups or as types of voters, each having an independent base of influence. The negotiation of these forces led to the final decision (Banfield, 1961).

The major characteristics of the process was a decentralization of independent actors, formal and informal, each having influence on decision-makers. In order to make a decision, it was up to the administrative head, the mayor, to centralize the multitude of actors through patronage of the party machine. Even so, there were obstacles beyond his sphere of influence. He could be checked by a public official outside the party, the courts, whose value system and base of support was outside the realm of party machinery, the vast amount of interest groups, and the voters who were not responsive to the patronage of the party ward leaders. The process of political (internal) action was one of continual interplay between officials, electorate, interest groups, and the courts (Banfield, 1961:233-239). Cleavages represented conflicting values, interests, and attitudes between the forces of "good government," and those desiring a continuance of political patronage. Shared attachments represented negotiations in the form of bargains, accommodations, and mutual compromise (Banfield, 1961:256).

In order for decisions to be adopted, control over actors was centralized and autonomy held at a controlled level. This was accomplished by the exertion of influence or power, defined as either gains and losses valued by the actor for himself or for a group (private regarding power),



or an abstract public interest (public regarding power). The model is one of transaction. For example, A, having only public regarding power, wished to influence C, who responds to only private regarding power. In order to influence C, A influenced B, who responded to public regarding power and had private regarding power. A can influence C by going through B. The decision was formulated by the process of transaction. As the number of actors increased, therefore increasing the complexity of value systems, the process of negotiated control decreased (Banfield, 1961:310-318).

#### IV

#### Mathematical Solution

In this section, several variables affecting the socio-psychological requisites of such a duality (internal vis-à-vis external) have been proposed and solutions have been offered.

Subscript	p	=	refers to public
	g	=	refers to decision-makers
	A	=	anxiety
	D	=	disorganization
	O	=	opinion-formation
	I	=	influence
	C	=	communication
	C <sub>1</sub>	=	type of communication (stressing or leading to a collective self-image or definition)
	A <sub>t</sub>	=	anxiety tolerance level for general population
	a <sub>k</sub>	=	degree of ambivalence among the people during keynoting
	U	=	uncertainty
	C <sub>gp</sub>	=	communication between the decision-makers and the public
	O <sub>G</sub>	=	group orientation
	O <sub>1</sub>	=	self-orientation (individual orientation)
	f <sub>1</sub>	=	function (in mathematical sense)
	u	=	unstructured situation

#### Hypotheses:

- A. Inadequate communication results in the decision-maker's lack of functional-normative integration--i.e. norms, values, and his roles may break down. People may lose certainty in knowing what the decision-makers believe or want (Turner and Killian, 1957:36).
- B. The greater the (internal) situational uncertainty, the greater will be the fluctuation in the judgmental behavior by the decision-maker and the more the susceptibility to suggestion from others (external), the greater will be the role conflict (Turner and Killian, 1957:51).
- C. The amount of communication emitted by the decision-makers leading to a collective self-image corresponds to the (increase in) amount of influence of the leadership.

- D. If the anxiety situation of the decision-maker is inordinately high, there is less breakdown in unstructured situations.
- E. As the degree of ambivalence among the public (external) during keynoting increases, the greater the ability of keynoting to influence the public; or, the higher the degree of ambivalence of the public, the greater the ability of keynoting to influence the public.
- F. The greater the anxiety of the decision-maker, the greater the external orientation versus internal orientation (in the sense of external dependence).

Test:

$$\begin{aligned}
 U &= f(d_0_p/dt) = f_1(D_p) && \text{This is from hypothesis B . . . (1)} \\
 I_g &= f_2(C_1) && \text{From hypotheses A and C . . . . (2)} \\
 (A_t)_{up} &= f_3(1/D_p) && \text{From hypothesis D . . . . . (3)} \\
 A &= f_4(0_G/0_I) && \text{From hypothesis F . . . . . (4)} \\
 D &= f_5\left(\frac{d_0_p}{(A_t)_{up}}\right) && \text{From equations 1 and 3 (note that equation 1 assumed the other variables are constant--a temporary device to focus consideration on only one quantity) . . . . . (5)} \\
 I_g &= f_6(1/D) && \text{By definitions . . . . . (6)} \\
 I_g &= f_7\left(\frac{C_{gp}}{dC_1}\right) f_{7a}(0_G)_p f_{7b}(a_k) && \text{From hypotheses E, C, A, and psychological studies (references below) . . . . . (7)} \\
 \frac{d_0_p}{dt} &= f_8\left(\frac{dC_1}{C_{gp}}\right) f_{8a}\left(\frac{1}{0_{GP}}\right) && \text{. . . . . (8)} \\
 \frac{d_0_p}{(A_t)_{up}} &= \frac{dC_1}{C_{gp}} f_{8a}(a_k) &&
 \end{aligned}$$

From equations 6 and 7, with no additional assumptions.

Note that  $f_{1a}, f_{2a}, \dots, f_{3a}, \dots, f_{8a}$  are just notations for "is some function of," for different particular functions.

Equation 8's solution is facilitated by a wide variety of simplifying assumptions. In the absence of more knowledge about the exact forms of the functions, the simplest assumption might be that the equation has the form:

$$\frac{d_0_p}{dt} = \frac{(A_t)_{up}}{C_{gp} a_k (0_G)_p} \frac{dC_1}{dt} = 0 \dots \dots \dots (9)$$

A similar assumption gives, for equation 7:

$$I_g = C_{gp} 0_{GP} a_k \dots \dots \dots (10)$$

With this modification, the study of Sherif and Harvey (Sherif and Harvey, 1952:272-305) enables us to make use of some additional hypotheses, summarized here as:

$$C_{gp} = \frac{O_p^+}{O_p^-} \dots \dots \dots (11)$$

Where + represents opinion formation favorable to the decision-makers, - represents opinion formation unfavorable to the decision-makers.

V

Conclusion

The preceding mathematical solution has only accounted for a few attributes to demonstrate the functioning of the proposed theory. Its aim is to serve an exemplary purpose. The choice of variables is determined through observation, measurement, and analysis. The proposed theory gives recognition to the process of decision-making, an insight which thus far has been lacking in the literature. The transactional theory of decision-making as advanced here extends Simon's (1958) discussion of "bounded rationality" and enhances Lindblom's (1965) elaboration of "mutual adjustment" by accounting for both the social (external) and political (internal) determinants of a decision-maker's behavior. It also advances an analytic insight to the concept that decision-makers exist within an arena of conflicting values, interests, attitudes and opinions of what public policy should be, and what is in a decision-maker's own interests. As illustrated, there are the interest of specific groups and multitude of interest groups, combined with the political desire of a public official to remain in office. There are the short and long run interests of society within a mixture of differing norms and values and a minimum consensus of what a decision should consist of. There are the sociological determinants of the decision-maker's behavior (data on socialization) which cannot be overlooked. A symmetric scheme of cause and effect provides only a limited view of this process. The transactional approach by extending the present level of causal inference, at least, provides theoretical understanding of the decision-making process.

FOOTNOTE

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