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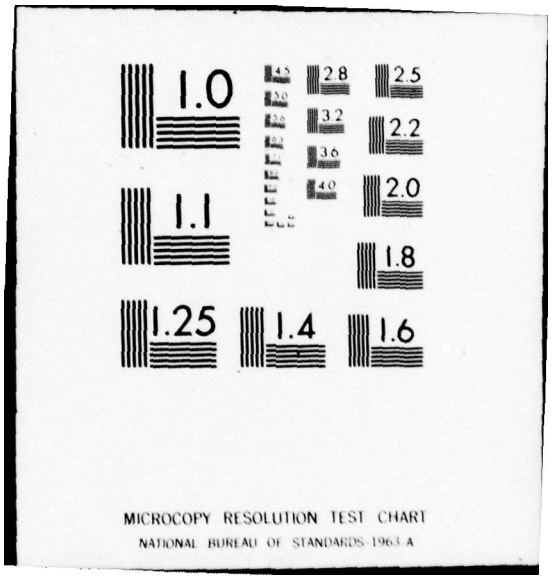
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# Toward An Information Processing Theory of Leadership Attribution: A Review and a Paradigm for Research#

by

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Presented at

Joint National Meeting of the Institute of Management Sciences
And Operations Research Society of America
New York City - May 1-3, 1978

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#This research was supported by Research Grant No. N00014-76-C-007 from the Office of Naval Research.

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

## REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: Technical Report No. 5
2. GOVT ACCESSION NO.:
3. RECIPIENT'S CATALOG NUMBER:

4. TITLE (and Subtitle): Toward An Information Processing Theory of Leadership Attribution: A Review and a Paradigm for Research.

5. TYPE OF REPORT & PERIOD COVERED: Progress rept.

6. PERFORMING ORG. REPORT NUMBER:

7. AUTHOR(s): Arie Y. Lewin and Shelley S. Layman

8. CONTRACT OR GRANT NUMBER(s): N00014-76-C-0007

9. PERFORMING ORGANIZATION NAME AND ADDRESS:
Graduate School of Business Administration
Duke University
Durham, North Carolina 27706

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: NR 170-805

11. CONTROLLING OFFICE NAME AND ADDRESS:
Organizational Effectiveness Research
Office of Naval Research
Arlington, VA 22217

12. REPORT DATE: May 1978

13. NUMBER OF PAGES: 40

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): TR-5

15. SECURITY CLASS. (of this report): Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report)

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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

| | |
|---|---|
| Leadership Theory | Information Processing |
| Attribution Theory | Protocol Tracing |
| Person Perception | Peer Nominations |

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Historically, leadership research has followed a cycle of extending, reworking, discarding and developing new ideas as the inadequacies and limitations of existing theories were realized. Calder (1977), Pfeffer (1977), and Mitchell, Larson & Green (1975) have all argued for the need to study leadership as a process of attribution. This paper presents the case for the study of leadership as an attribution process; reports on the results of two studies in which information processing models were developed of the attribution process in which

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Unclassified

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## Abstract

Historically, leadership research has followed a cycle of extending, reworking, discarding and developing new ideas as the inadequacies and limitations of existing theories were realized. Calder (1977), Pfeffer (1977), and Mitchell, Larson & Green (1975) have all argued for the need to study leadership as a process of attribution. This paper presents the case for the study of leadership as an attribution process; reports on the results of two studies in which information processing models were developed of the attribution process in which individuals engage while rating their peers on several sociometric measures of leadership; and proposes a paradigm for the study of the leadership attribution processes within actual organizational settings.

# Toward an Information Processing Theory of Leadership Attribution: A Review and a Paradigm for Research

## Introduction

In a recent comprehensive review of the literature, House and Baetz (in press) have shown that the progression of leadership research has been characterized by continually discarding and developing of new ideas as the inadequacies and limitations of existing theories and methodologies are realized. The theoretical and empirical approach to the study of leadership has been one of assuming it as a scientific construct, advancing a definition, developing a priori models of this construct, and formulating various ways to test these models. Figure 1 summarizes traditional leadership research and its relationship to the process of attributing leadership. It is our belief that this traditional approach to the study of leadership is self-limiting and may be responsible for many of the contradictory findings and poor correlations among the parameters of the various a priori models.

Noting the restrictive nature of the traditional paradigm for leadership research , Calder (1977), Mitchell, Larson and Green (1975), and Pfeffer (1977) have argued for the need to study leadership as a process of attribution. Similarly, Lord (1976) conceptualizes the attribution of leadership as a special case of person perception.

The question remains: How does an individual attribute leadership to another person? What is the actual judgement process? Carroll, Payne Frieze and Girard (1976) have suggested the feasibility of applying information processing (IP) methods to the study of attribution processes in general, and have specifically considered the case of parole

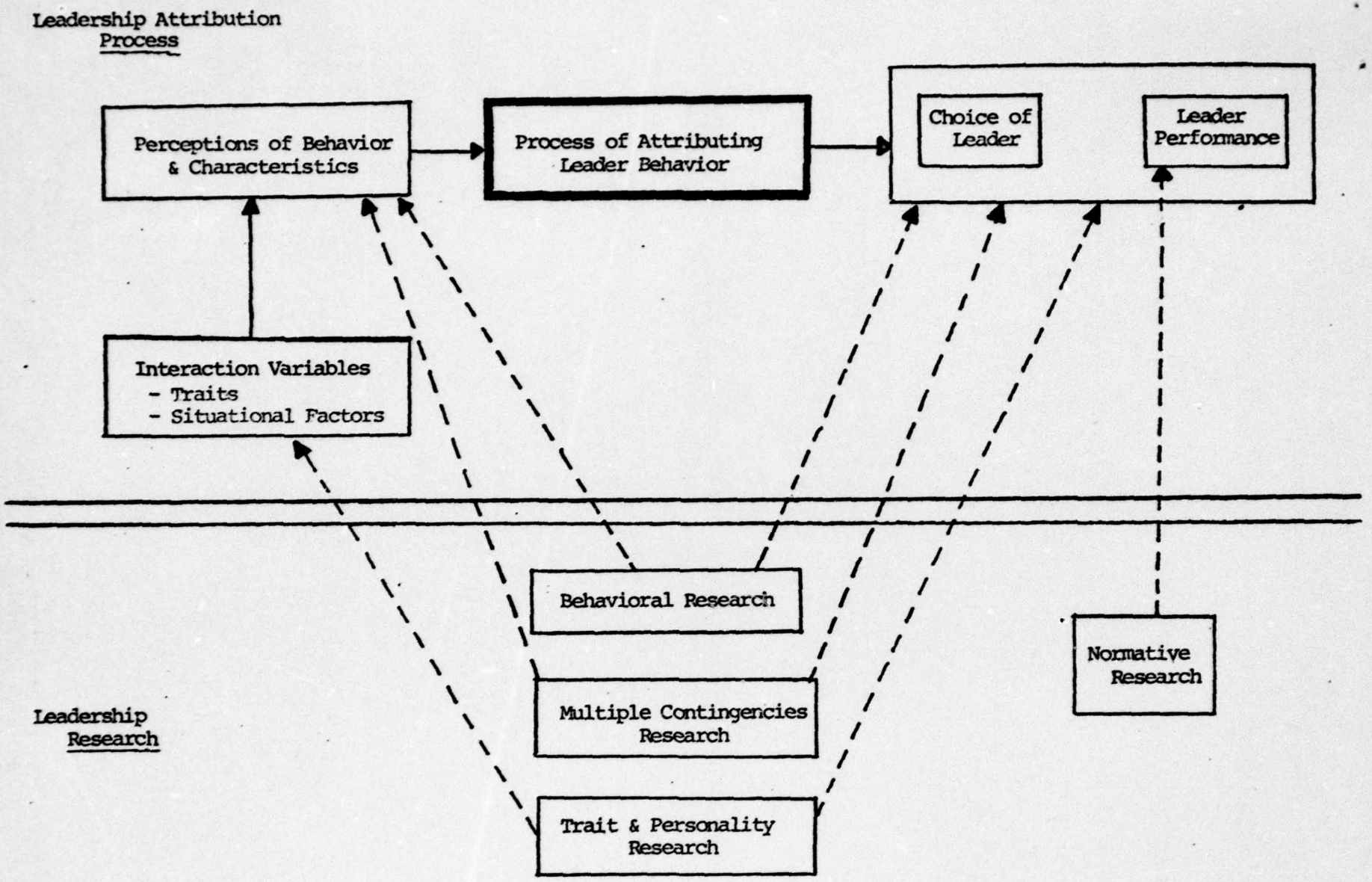



Figure 1. Leadership attribution research as it relates to the leadership attribution process.

decision making (Carroll & Payne, 1976). Similarly, Lewin and Zwany (1976) have propqsed the application of the IP methodology to derive descriptive/ predictive models of the peer nomination process. Following the paradigm proposed by Lewin and Zwany (1976), Lewin and Layman (1978) empirically derived IP attribution models of person perception -- for the special case of peer nominations -- using leadership criteria.

It is well recognized thatthe assessment and prediction of leadership is situationally contingent. To determine the organizationally and job specific parameters of leadership attribution, it would be necessary to study the leadership attribution process within real organizational settings and across different positions and job situations. Furthermore, the leadership attribution process of supericrs, subordinates, peers, and the organization can be expected to be partially unique and therefore, to involve additional specific parameters. To identify these situation specific parameters, it would be necessary to obtain attribution judgements at the time such judgements are being made.

Following a selective review of the nature and findings of past leadership research, we develop the case for an attributional approach to the study of leadership and for the application of information processing theory to the analysis of this attribution process. The paper concludes with a research paradigm applying the IP methodology to the development of empirically derived and testable models of the judgement process of individuals when attributing leadership to others in actual organizational settings.

## Theories of Leadership

The following section will present a selective review of several leadership theories which are representative of the direction that leadership research has taken.

The earliest approach to the study of leadership was to identify various personality traits which distinguished leaders from nonleaders, effective from noneffective leaders, and higher echelon leaders from lower echelon leaders. Stogdill's extensive reviews (1948, 1974) of 70 years of trait research indicate that several traits (i.e. intelligence, dominance, self-confidence, energy/activity and task relevant knowledge) were consistently associated with leadership, though none of the traits were found to correlate with leadership in all of the studies. Correlations generally range between .25 to .35. In their review of the leadership literature, House and Baetz (in press) suggest that the mixed findings, concerning the leadership traits reported by Stogdill (1948, 1974), could be reconciled by reclassifying the studies according to the populations studied (e.g. sex, age); type of tasks performed (e.g. routine vs. nonroutine); methods used to measure traits (e.g. tests and questionnaire responses); and criterion variables (e.g. effective vs. ineffective leaders). They speculate that "there are certain properties of all leadership situations that are present to a significant degree and relatively invariant, and that there are likely to be some specific traits required in most if not all leadership situations" (p. 16). Invariant characteristics include social skills, ability to influence and organizational skills.

Another popular approach in the study of leadership is to determine those behaviors which are characteristic of a leader. Two main bodies of literature emerge from the leadership behavior concept, those studies dealing with the Consideration and Initiating Structure dimensions, and the Participative decision making research.

The Consideration (C) and Initiating Structure (S) dimensions were factor-analytically derived from descriptions volunteered by subordinates, of their supervisors' behaviors in the "Leadership in a Democracy" research program of the Ohio State University. Three scales are commonly used to measure the C and S dimensions: (1) the Leadership Opinion Questionnaire (LOQ), (2) the Leadership Behavior Description Questionnaire (LBDQ), and (3) the Supervisory Behavior Description Questionnaire (SBDQ). Extensive research has been conducted to assess the relationship between a leader's score on these scales and such factors as employee satisfaction, performance, expectations, turnover and grievances. (e.g. Fleishman & Harris 1962; House, Filley & Kerr, 1971).

The validity, reliability, and scaling adequacy of the Ohio State leadership scales have been frequently examined (e.g. Schriesheim & Kerr 1974). In addition, there has been considerable controversy over the orthogonality of Consideration and Initiating Structure (e.g. Bales, 1958; Fiedler 1964; Weissenberg, 1965; Lowin, Hrapchak & Kavanagh 1969; Weissenberg & Kavanagh, 1972). The findings resulting from all of this research are very mixed. The popular reason for most of this confusion is that it lies in the scales used. For example, the LBDQ consists

of items describing a leader who is more communicative, and is concerned with the relationships among group members and their performance; whereas the SBDQ describes a highly production oriented, autocratic and punitive leader.

The problem of operationally defining Consideration and Initiating Structure has been noted by Lowen, Hrapchak & Kavanagh (1969) and Lewin and Layman (1977). Lowin et.al (1969) contend that broader definitions of C and S are required, and...."because the available definitions are inductively tied to specific items, it becomes crucial to evaluate the success with which these items could be generalized into categories" (p. 246). They conducted an experiment using scripts to determine what was and what was not meant by each concept. In preparing the scripts Lowin et.al (1969) found that the Consideration concept was well elaborated, but the Initiating Structure concept was ambiguous. Lewin and Layman (1977) also noted the inadequacy of the Consideration and Initiating Structure dimensions. They believe much of the confusion lies in the methodology employed and suggest the use of information processing techniques to obtain operational definitions.

In addition, findings by Rush, Thomas and Lord (1977) question the internal validity of behavioral questionnaires, in particular the LBDQ (XII). They found that the behavioral ratings were significantly affected by implicit leadership theories held by the people responding to the questionnaire. Similar conclusions were reached by Eden and Leviatian (1975).

As with the Consideration and Initiating Structure dimensions, there has been considerable controversy concerning Participative leadership. House and Baetz (in press) distinguish between two forms of participative leadership:

(1) participative decision making (PDM) concerns a specific decision where a leader makes an effort to insure that all those who will be effected by a decision have an opportunity to influence the final outcome.

(2) participative supervision (PS) refers to the manner of day-to-day interactions between the leader and follower. In this instance the leader encourages subordinate input into how daily work is to be done.

House and Baetz (in press), noted that although PDM and PS are clear conceptually, no distinction is made between the two forms. The studies in their review also fail to distinguish between subordinates having the opportunity to influence decision making and actually seeing their input affect the supervisor's decision. In addition, it is worthwhile to note that both PDM and PS are leader initiated behaviors. Research by Lewin and Layman (in press) on ad hoc groups indicates that the emergent leader is that person who engages in a mutual influencing exchange with the majority of group members. An important aspect of this relationship is that attempts to influence are initiated by both individuals.

There have been numerous studies concerned with the effects of participative leadership. Stogdill (1974) reviewed 32 such studies correlating productivity, satisfaction and cohesiveness with participative leadership

styles; Filley, House & Kerr (1976) reviewed 33 studies which measured the relationship between subordinate satisfaction alone and participation; Maier (1963, 1970) and his associates conducted over thirty laboratory studies concerning the degree to which participative leadership results in effective decision. Our of this research it appears that participative leadership is most effective under conditions where tasks are ego-involving, unstructured, and when subordinates have the ability and inclination to contribute to the participative process.

The "situational" or contingency approach to leadership research continues to be a popular paradigm. This approach holds the view that it is necessary to specify the situational parameters that affect the relationship between leader behavior and some criteria. The contingency model advanced by Fiedler (1967), Chemers & Skrzypek (1972) and Fiedler & Chemers (1974), for example, is based on the theory that the task performance of the leader depends on a proper match between the motivational structure of the leader and the control and influence which the situation provides. The leader's motivational structure is measured by the least preferred co-worker (LPC) scale. A high LPC score identifies those leaders who are relationship motivated, whereas the task motivated individual generally has low LPC scores. The leader's control and influence is determined by three situational factors: (1) leader-member relations, (2) task structure, and (3) position power.

There has been considerable criticism and conflicting results centered around this model with no reconciliation to-date of the findings. Several reasons for failure of the contingency model are suggested. Graen, Orris and Alvares (1971) feel the problem lies in methodological errors; Vecchio (1977) suggests that the theory is either task or population bound; in addition, House and Baetz (in press) recognize the lack of general-

izability of the theory, the ambiguous interpretation of the LPC measure, and the lack of an explanation for the effectiveness of high LPC leaders in medium favorability situations.

Another theory based on the interaction of situational factors and leader behaviors is the Path Goal theory (Evans, 1970; House & Mitchell, 1974). Its major concern is how the leader influences subordiante perceptions of their work and personal goals, and paths to goal attainment. The theory suggests that the behavior of a leader is satisfying or motivating to the degree that it increases subordinate goal attainment and clarifies the paths to these goals (House & Mitchell, 1974).

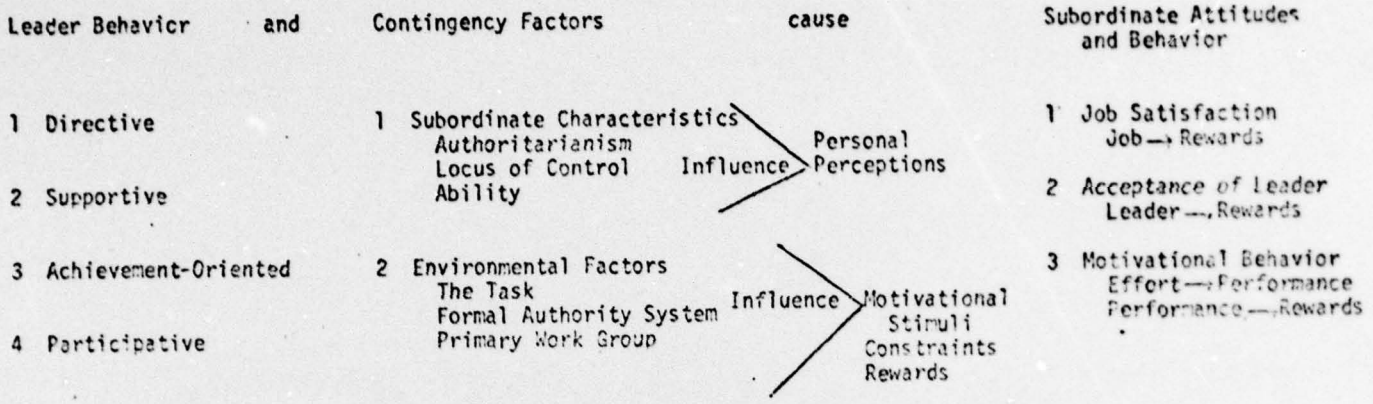
There are two propositions of the path-goal theory. First, that leader behavior is acceptable and satisfying to subordinates to the extent that the subordinates see such behavior as an immediate source of satisfaction or as instrumental to future satisfaction. Second, that the leader's behavior will be motivational in that it makes satisfaction of subordinate's needs contingent on effective performance, and it complements the environment of subordinates by providing the guidance and rewards necessary for effective performance.

These two propositions suggest that the leader's functions are to enhance subordinates' performance, job satisfaction, and leader acceptance.

In addition there are two classes of situational variables which are asserted to be contingency variables: (1) the personal characteristics of the subordinate (i.e. perceived abilities, locus of control, and authoritarianism); and (2) the environmental demands with which the subordinates must cope (i.e. the subordinate's task, the formal authority system of the organization, and the primary work group). House and Mitchell (1974) summarize the theory as shown in Figure 2 presented below:

Figure 2. Summary of Path-Goal Relationships (House and Mitchell, 1974:89)






The theory has been tested in a limited number of studies, however, the methodologies used to test the theory have been recently questioned. Sheridan, Downey and Slocum (1975) and Dessler and Valenzi (1977) have argued that path analysis should be used to test the Path Goal Theory when relying on correlation data. Sheridan, et.al. (1975), for example, did not find support for the direct causal relationships hypothesized in Path-Goal theory. Though the findings of Dessler and Valenzi (1977) supported the hypothesized relationships between leader behavior and subordinate expectances they did not find support for the hypothesis that occupational level effects the relationship between intrinsic job satisfaction and initiation of structure.

In summary, the leadership research reviewed in this section demonstrates that leader behaviors can potentially influence such important variables as subordinate satisfaction, performance and motivation; and that such variables can, in turn, effect leader behavior. The various approaches to the study of leadership reviewed involved: 1) the identification of traits

and personality characteristics of a leader; 2) the study of leadership styles: Consideration, Initiating Structure and Participative; 3) the study of how a leader influences subordinate perceptions of their work and personal goals, and paths to goal attainment; and 4) the identification of the situational parameters which affect the relationship between leader behavior and some criteria. In this fourth approach, the task performance of the leader is viewed as contingent upon a proper match between the leader's motivational structure -- relationship or task motivated -- and the leader's control and influence determined by the situational factors -- leader member relations, task structure and position power.

In addition, using different a priori models, other factors affecting leadership behavior could be conjured up for further research. Examples might include the effect of the organization design on leader behavior; how the type of leader and consequently the range of leadership behaviors may be restricted by the management selection process itself; how the leadership behavior is affected by geographic location, and access to information and resources; the effect of the "visibility" of the managerial job on leader performance; the leadership requirements in crisis situations, e.g. during economic instability; and so forth. This is far from an inclusive list; with a little effort it could be extended infinitly. It is, however, illustrative of the process by which variables are suggested for research depending upon the proposed a priori model of leadership. The larger question is how to approach the study of leadership in a way that will identify the variables to be studied without being model or intuition bound?

Perhaps a starting point to examining this question might be to recognize that judgements about leadership are made regularly by individuals in informal groups, by managers in organizations, etc. Assessment centers, for

example, are required to make these decisions routinely. Thus, perhaps a more productive approach to leadership research might be to study the process of leadership attribution, in otherwords, to study the judgement process in which individuals and organizations engage when making leadership attributions. As seen in Figure 1, research has not been directed toward the attribution process itself.

The remainder of this paper argues the case for leadership as an attribution process and for the feasibility of applying information processing methodology to the study of this judgement process; and proposes a paradigm for leadership attribution research within an organizational setting.

Attribution Theory of Leadership

The general approach to the study of leadership, theoretically as well as empirically, has been to develop a priori models of a construct of leadership and then to develop questionnaires, surveys or other means of data collection (e.g. in basket simulations, critical incidents, etc.) to test these models. From our selective review of the more popular approaches to leadership research, it is evident that there exists much confusion, contradiction and subjectivity with regard to methodologies and results. An example is the use of the Leadership Behavior Description Questionnaire (LBDQ) and the Supervisory Behavior Description Questionnaire (SBDQ). Both are a product of factor analysis. Deciding on a cumulative concept to represent a factor is, however, inevitably a partially subjective process (Pfeffer 1977). In addition, each questionnaire is focused toward a particular type of leader. The LBDQ is follower oriented whereas the SBDQ is task oriented. It is not surprising therefore, that inconsistent results are obtained.

Pfeffer (1977) addresses three problems with the concept of leadership: the ambiguity of the definition and measurement of the concept; the issue of whether leadership affects organizational performance; and the actual process of selecting leaders. He conclues that leadership is a process of attributing causation to individual social actors,

explains that much of the thinking about leadership is an attribution — the tendency of individuals to attribute outcomes to persons rather than environmental forces outside their control; and that studying the process of attributing leadership might be a more productive approach to the analysis of this phenomenon.

Lombardo (1977) suggests that what is needed are answers to such questions as "How are [leaders] perceived?" and "What underlies a person being seen as a leader?" (p. 22) In reviewing a study by Eden and Leviatian (1975), who found that students with no organizational experience could replicate the Ohio State leadership dimensions (consideration and initiating structure) when asked to describe managers in a fictitious plant using the Survey of Organizations (Taylor & Bowers, 1970), Lombardo (1977) questioned whether the qualities attributed to leaders were merely cultural values — that is concern for goals and for the people who carry out those goals. In addition, Mitchell, Larson and Green (1975) suggest that an attributional process may confound some of the interpretations of complex leadership theories where situational moderators are used (see also Staw 1975).

Calder (1977) argues that the problem of leadership research lies not with the theories of leadership, but with the methodology. Since the heart of the problem is conceptualization, Calder advances an attributional theory of leadership. According to this theory, leadership is an inference based on observed behaviors. "Inferences about leadership are made only from differences in behavior which fit expectations of how leaders typically behave...such expectations are different for different groups of actors." (p. 190) For example, members of a street gang focus on behaviors which are quite different from those important in the corporate board room. In addition to evidential behaviors differing across group of actors, they are also distinct from other behaviors occuring within the group itself.

It is important that evidential behaviors are typical of a class of behaviors which are different from those of most group members. This premise is compatible with Hollander's (1958) idiosyncratic theory of leadership. According to this theory, a leader builds up idiosyncratic credits from early group conformity which enables him to later differ in his behavior in order to benefit the group. It is Calder's (1977) view that leaders are not leaders until there is some basis for distinguishing their behavior.

Calder's (1977) theory of the attribution of leadership is composed of four stages: 1) the behavior of another and its effects are observed, (2) the actual and inferred observations are either accepted or rejected as evidence of leadership, (3) evaluation is made of the observed behavior and its effects by comparing them to what the observer believes to be the personal alternatives to the actor, and (4) the potential of individual biases to affect attributions is considered. In otherwords, if the goals of the actor are compatible with those of the observer, there will be a stronger tendency for the attribution of leadership. Hollander (1964) arrives at a similar prediction from his assertion that the leader must be perceived as having a high degree of identification with the group values and goals.

Important are Clader's (1977) affirmations that leadership exists only as a perception, that it has meaning only as defined by a particular group of actors, and that research must be directed toward the underlying nature of the leadership attribution process. House and Baetz (1978) feel that Calder's theory is clearly testable and state their belief that:

> "if it is shown that the process described in [Calder's] theory predicts the attribution of leadership, and that the attribution of leadership is associated with follower satisfaction, motivation, and performance, the theory will have made a significant contribution to the understanding of the leadership phenomena." (p. 97)

Clearly, there is a need to study the attribution process of leadership. If, however, attribution theory is to be a promising approach to the study of leadership, how should such research be conducted?

Attribution Theory and Information Processing

The field of person perception is concerned with how we perceive and come to know the characteristics of others, that is, how we make inferences about the internal states or qualities of others (e.g.: emotional state, intelligence, occupational skills). It consists of four basic elements: 1) the object-person's characteristics or state, their concomitants, and certain cues derived from the environment; 2) the set of cues actually utilized by the judge; 3) the cognitive processes which occur within the judge; and 4) the final result - the judgment or decision. In more formal terms, we may describe these elements as: 1) the total set of data available to the judge, derived from the object-person, the environment, and their interaction; 2) the set of data actually processed by the judge; 3) the cognitive processes utilized; and 4) the final decision.

The general field of perception research, however, has "....been somewhat hindered by an excess of empirical enthusiasm and perhaps a deficit of theoretical surmise. Extension of various forms of psychological theory into the area of interpersonal judgment may have the effect of introducing order where little now exists." (Tagiuri, 1969, p. 433). Attribution theory is an explicit attempt to operationalize the elements of person perception. The theory is concerned with how people interpret information about their own behavior and the behavior of others in making judgments about the causes of events, and how these judgments are used and affect the person's behavior. The theory attempts to specify how a person infers or attributes cause and what happens once he does. Attribution theory is based on the principle that people attempt to determine the causes of events in order to predict and control their social world (Heider, 1944, 1958). Studies of attribution rely primarily on two theoretical perspectives: (1) Kelly's (1967, 1971, 1972) covariation principle, and (2) the hedonic relevance approach of Jones and

Davis (1965). Both theoretical perspectives dwell on conditions which determine whether a behavior is attributed to situational, personal or internal factors.

Attribution research is primarily conducted within the traditional paradigm of experimental social psychology. The situation is systematically varied, judgements are then measured, and the processes within the subjects are inferred from the outcomes. The subject is regarded as a "black box" -- focus is directed toward the end product of the judgement process and not on the information being processed in the subject's mind. The traditional experimental paradigm is not intended or suited for a direct observation of a personal thought process. In fact, it is not possible to obtain the structure of the thought processes by investigating only process inputs and outputs, or in the case of interaction variables, to focus on the relation of inputs and outputs. Calder (1977) concludes that focusing separately on either behaviors or effects is an oversimplification. Similarly, Carroll, Payne, Frieze and Girard (1976) argue that the traditional paradigm is restricted in its ability to generate and test process descriptions.

In their review of the literature dealing with the modelling of human decision making, Slovic and Lichtenstein (1971) concluded that: "The evidence to date seems to indicate that subjects are processing information in ways fundamentally different...[from those of the traditional regression and Bayesian approaches]...we will have to develop new models and different methods of experimentation." (p. 729). They also suggest the technique of information processing modelling as a promising strategy for the development of a theory of human judgement. Lewin and Zwany (1976) reach similar conclusions regarding the need for, and feasibility of, developing information processing models in the study of person perception in general, and the peer

nomination process in particular (which itself is an attribution process); and Carroll, et.a. (1976) advocate the application of information processing (IP) methodology specifically in the case of performing research on causal attributions.

The information processing approach to studying judgement seeks to understand how people examine, evaluate, and combine information pursuant to a task or decision -- the psychological processes which lead to a judgement or decision. This is in contrast to research which seeks to describe the relationships between decisions and the properties of the data available for the decision makers.

The theory and empirical research on information processing can be traced to the work by Newell, Shaw and Simon (1957). Their theory is built on the premise that such processes as thought, verbal behavior, and problem solving behaviors are performed as sequential information processing steps. These "elementary processes" consist of such operations as: storing information in familiar symbols or "chunks", retrieving it, moving it, generating transformed data, comparing two symbols for equality, and associating two symbols. In otherwords, these elementary processes are simple logic manipulations of data.

The basis of cognitive process modelling is that individuals solve a problem by first developing a problem space -- a psychological representation of the task environment. Intelligence, the information available to an individual from his memory, and the objective task environment determine the problem space. Next, the space is searched for a solution by means of a program. In otherwords, the individual will operate upon his information until he achieves his goal. The fundamental limitation on this solution process is the ability of the individual to store data in a dynamic (quickly alternable) memory. Newell and Simon (1972) conclude that indi-

viduals cannot store more than five to seven dimensions to a problem which will be considered, no matter what its complexity. Actually, individuals usually consider fewer than five aspects of a problem. Newell et.al. (1972) contend that abstractions from "reality" characteristically involve perhaps only two symbolic representations at any given time.

Cognitive process programs are constructed from information elicited from a subject while performing a task. One method of collecting this information is by obtaining a verbal self-report from the subject as he solves a problem. This record of the subject's reported thought process is known as a protocol. The value of this method of obtaining the decision process behavior, has been noted by Simon (1976): "....[a] technique...used to increase the density of observations of the information-processing system stream [is] recording think-aloud protocols of the problem solver's verbalizations during his activity." (p. 28). Similarly Payne (1976), in an analysis of the various models of decision making, concluded that asking subjects to "think aloud" while making their decisions, provides valuable insights into the information processing strategies which led a subject to make a particular choice. Newell (1966) has developed a methodology for the analysis of protocols based upon content analysis. His procedure allows for the discovery of the patterns of thought which underlie behavior.

Information processing techniques have been successfully applied in various decision making situations, for example in municipal zoning decisions (Davis & Reuter, 1962), budget decisions (Weber, 1965, Crecine, 1967; Gerwin, 1969), apartment selection (Payne, 1976), for the behavior of a bank trust investment officer (Clarkson, 1962), and for human inference processes (Gerwin, 1974).

Smith and Greenlaw (1967) derived an information processing model of a psychologist responsible for personnel selection. They essentially duplicated both the psychologist's personality assessments and employment recommendations. The psychologist made one of four recommendations: hire or promote, hire as a fair risk, do a background check, or reject. The model was constructed on the basis of detailed analysis of the psychologist' protocols, and information gathered from test manuals and co-workers. For eight entirely new cases, the model predicted the psychologist's recommendation on 7. For the eighth case the model suggested hiring the applicant as a fair risk, while the psychologist recommended a background check (a search for more information). Overall, the percentage of correct statements made by the model was 94%.

Carroll and Payne (1977) studied a special case of person perception, that of parole decisions. They asked expert parole decision makers to "think aloud" while examining several actual parole cases, to tell what they read, thought about, etc. Coding of these verbal protocols indicated that attributions constituted the single most frequent catagory of statements which went beyond the information present. The most frequent types of attributions were personality, plans/motives, environment, and impulse.

Lewin and Layman (1978, in press) applied protocol tracing techniques to empirically derive descriptive/predictive models of the attribution process individuals engage in while rating their peers on several sociometric measures of leadership.

They conducted two separate, but identical studies: 1) with Duke University students as subjects, and 2) with Naval officers at the Naval Postgraduate School (NPS) in Monterey. Each simulation consisted of six phases: (1) subjects received an orientation -- they were to assume the role of a management consulting team, meeting in the surprise absence of

their project team leader, to prepare preliminary recommendations to a hypothetical company described in a case, (2) case material about the company was distributed to each subject and read individually; (3) the case was jointly discussed and analyzed by the group to arrive at the recommendations (this phase was videotaped); (4) subjects viewed themselves on videotape; (5) A peer evaluation questionnaire was completed. (Subjects were to exclude themselves and rank the members in their group on leadership sociometrics, e.g. "Who would you go to for help on a tough problem?", "Who was pulling most for the group?", "Who was best at handling people?" and "Who has the best overall leadership qualities?"); (6) during a private interview a practice "thinking aloud" question was administered to each subject and a protocol was obtained using a sociometric which was omitted from his or her questionnaire.

Protocol analysis identified the primary factors which composed the IP model for a particular sociometric, and the information categories -- verbal and nonverbal behaviors -- which subjects search to infer the representation of the model. The primary factors included: (1) a Mutual Influencing exchange (MI), (2) having the ability to Listen (L), (3) the Quanity of Verbal Communication (QVC), and (4) being Directive in a Socially acceptable manner (S-D). Lewin and Layman (1978, in press) found that although the protocol analysis yielded the same primary factors for both populations, there was a difference in the structure of the information processing models between the Duke and NPS subjects for the various sociometrics. Table 1 summarizes these findings.

Table 1

Summary of Key Parameters for each Sociometric Question

| Sociometric | Primary Factors | | Frequency Stated in Protocols | |
|---|---|---|---|---|
| | Duke | NPS | Duke | NPS |
| 1. Who would you go to | MI | S-D | 32% | 27% |
| for help on a tough problem? | L | L | 32% | 27% |
| | | MI | | 13% |
| | | QVC | | 13% |
| 2. Who is pulling most for the | S-D | S-D | 27% | 73% |
| group? | L | MI | 27% | 18% |
| 3. Who is best at handling people? | S-D | S-D | 42% | 39% |
| | MI | QVD | 31% | 23% |
| | | MI | | 17% |
| | | L | | 16% |
| 4. Who shows the best overall | S-D | S-D | 48% | 47% |
| leadership qualities? | MI | L | 32% | 19% |
| | | MI | | 14% |
| | | QVC | | 11% |

Lewin and Layman (in press) tested their models by statistically comparing the rankings obtained from the models against the actual aggregate group peer rankings. Table 2 summarizes the results for the Duke subjects.

The results indicate that the information processing methodology employed is a very feasible strategy to empirically derive models of the leadership attribution process.

## Table 2

Summary of Spearman Rank Correlation between Actual Aggregate Peer Rankings and Predictions based Upon the Models of the Duke subjects.

| Sociometric & Models | Groups+ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 6[a] | 7 | 8 | 9[b] | 10 |
| 1. Who would you go to for help on a tough problem? | | | | | | | | | |
| Model: L + MI | .830* | .669 | .875* | .758* | .975* | .937** | .633 | .642 | .758* |
| Alternative Model: L | .919** | .785* | .928** | .785* | .625 | 1.000** | .893** | .642 | .571 |
| 2. Who is pulling most for the group? | | | | | | | | | |
| Model: S-D + QVC | .847* | .768* | .938** | .964** | 1.000** | .821* | .929** | .029 | .634 |
| Alternative Model: S-D | .946** | .946** | .928** | .991** | .700 | .955** | .964** | .486 | .875* |
| 3. Who is best at handling people? | | | | | | | | | |
| Model: S-D + MI | .777* | .705 | .777* | .571 | .925* | .286 | .946** | .486 | .938** |
| 4. Alternative Model: S-D | .830* | .714* | .777* | .598 | .975* | .813* | .964** | .486 | .875* |
| Who shows the best overall leadership qualities? | | | | | | | | | |
| Model: S-D + MI | .902** | .688 | .857* | .929** | .875 | .741* | .964** | .557 | .580 |
| Alternative Model: Dir + MI | .821* | .634 | .902** | .902** | .900** | .795* | .929* | .771 | .759* |

[a] $\underline{n} = 5$

[b] $\underline{n} = 6$

*$\underline{p} \geq .05$

**$\underline{p} \geq .01$

+ Videotape audio did not record precluding analysis of Group 5.

A Paradigm for Research on Leadership Attribution

Empirically, as well as theoretically, the Lewin and Layman (in press) study provides a foundation for future leadership research. The study of leadership in emergent situations by the use of ad-hoc groups alone is limited, however, because at best it can only lead to the identification of the most basic casual models of the attribution process common to all leadership situations. This is exemplified in the Lewin and Layman (in press) results. Their primary factors in many instances, are related qualitatively and conceptually to those hypothesized in other theories of leadership. For example, aspects of consideration and Initiating Structure and Participative leadership were evident in the sociometric question "Who shows the best overall leadership qualities?" The primary factors for this question were Social-Directive and Mutual Influence. Mutual Influence is operationally defined as the existence of a give and take exchange in the interaction between two or more group members where each exhibits good listening abilities and does not attempt to dominate the interchange. The following descriptors from the protocols illustrate this parameter: "can expound on my ideas", "we both contribute equally", "we agreed as well as disagreed with each others views", "was willing to listen and wouldn't dominate or restrict me from adding my side", "doesn't interrupt or dominate the conversation", "is willing to change his opinions". The descriptors of this factor clearly suggest that the two elements of participation--participative decision making and participative supervision--are components of Mutual Influence, with the distinction that attempts to influence are initiated by both individuals without being overly dogmatic and aggressive in ones views.

The Social-Directive parameter is operationally defined by Lewin and Layman (in press) as organizing and giving direction to the group and accomplishing this in a socially acceptable manner. In otherwords, a person ranking high on this dimension not only structures the problem solving process of the group, but he or she also involves other group members. This is illustrated in the following descriptors from the protocols: "initiates the discussion", "tries to get responses from other people", "brings group back on track", "gives the group structure-assigns various tasks", "pushes over ideas in a pleasant way", "able to look at both sides and reach a conclusion", etc. These descriptors clearly suggest that aspects of the Consideration and Initiating Structure dimensions are represented in the Social-Directive parameter. At the same time this parameter extends the descriptors of the Ohio State Leadership Behavior Description questionnaires.*

The Lewin and Layman (1978) results also indicate that leadership attribution models vary between different emergent groups: Duke University students and Navy professionals. This suggests that while the basic casual models may be shared across groups, that there also exists certain factors which may be situation and population specific.

The notion that implicit models of behavior are shared across persons is not new. Extensive research by Secord, Dukes and Bevan (1954) on personality impression formation from facial features strongly supports the high reliability of such shared models. Similar conclusions are reached by Nisbett and Wilson (1977), Lewin, Dubno and Akula (1971), Bem (1967), Eden and Leviatan (1975), Rush, Thomas and Lord (1977) and Abelson (1976).

*For a more complete discussion of the Lewin and Layman (1978) results as they relate to the LBDQ see Lewin (1977).

Assessments and prediction of leadership clearly is situationally contingent. Therefore, if leadership is to be conceived of as an outcome of an attribution process, it is imperative to recognize that multiple leadership attributions are possible within any organizational setting. Leadership attributions within actual organizations are contingent on several factors, for example, the nature of the task, (e.g. marketing, production, accounting, research, etc.) and the level at which the job is performed (e.g. first line supervisor, department head, etc.) In addition attributions might differ depending on who is attributing leadership to whom. Further, not all supervisory and managerial positions in an organization are equally important in terms of leader behavior. In any organization only certain positions are recognized as being critical in terms of the leadership behavior of the position occupant. Therefore, when studying leadership within an organization it is important to select those managers who are in positions which are viewed by the organization as being critical in terms of their leadership behavior.

Within any organization we conceive of four basic types of leadership attributions always occuring:

(1) supervisor of subordinate,

(2) subordinate of supervisor,

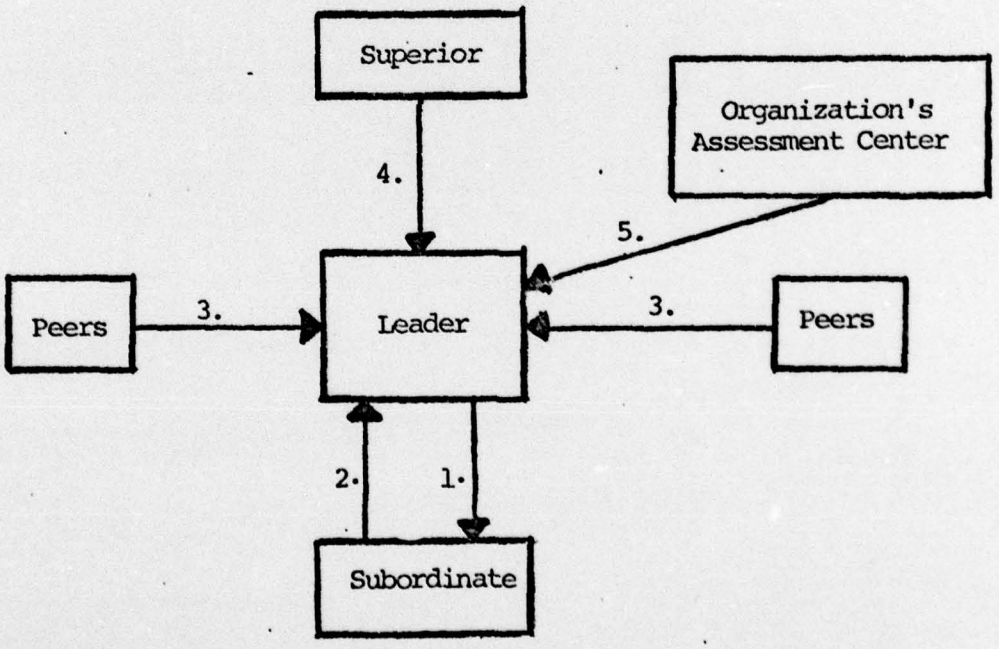
(3) the peers of the supervisor, and

(4) the attribution made by the supervisor's superior.

If the organization itself has a formal means of leader assessment, there could be a fifth type of attribution possible -- that of the assessment center. Figure 3 summarizes these relationships. To date, however, the majority of the research on leadership has primarily focused on the superior-subordinate relationship.

The leadership attribution process of superiors, subordinates peers, and the organization can be expected to be partially unique and therefore, to involve additional specific parameters. To identify these situation specific parameters, it is necessary to obtain attribution judgements at the time such judgements are being made. For example, at the organizational assessment center, or at the time superiors are required to evaluate their subordinates.

Figure 3. Basic leadership attributions for any task and level within an organization.



The proposed research paradigm would, therefore, involve the application of information processing methodology and protocol tracing techniques to obtain the different leadership attribution models (e.g. of superiors, subordinates, peers, etc.) at different levels within an actual organization and for job tasks where leadership is recognized as being of critical importance.

The possible outcomes of this research include: obtaining a class of models of leadership attribution; identifying the basic causal models common to all situations; and identifying those situationally specific parameters which are contingent upon the organization itself, level, and the individual relationships expressed in Figure 3. In addition, such research should identify which models are actually applied by the organization to make leadership assessment and management selection decisions. In other words, does an individual identified as having "high potential" for management rank high on any, all, or a combination of the attribution models?

Speculation, however, as to which leadership attribution models will emerge as determining the leader identification and selection processes in an organization is inconsequential at this time. What is important is to recognize that the framework of information processing research is such that the structure of leadership attribution models can be inferred from the data itself, and that the empirical results to date clearly support this research approach.

In addition, the descriptive models developed from the data will provide an empirical basis for developing normative rules for leadership behavior in an organization, contingent on a particular level and task within that organization. The work of Vroom and Yelton (1973) is a good example

of the potential of this approach. Their model, however, is related to the superior-subordinate attribution model only, and does not distinguish the situational aspects of an organization, and the level and task within that organization.

Finally, an often stated assumption is that leadership is associated with follower satisfaction, motivation and performance. This is a fundamental belief shared by many researchers on leadership. Whether this belief holds true, however, cannot be answered until we have gained an understanding of the actual decision process by which leaders are selected in an organization.

## References


Abelson, R. P. Script Processing in Attitude Formation and Decision Making. In J. S. Carroll & J.W. Payne (Eds.) Cognition and Social Behavior. New Jersey: Lawrence Erlbaum Assoc. Pub. 1976, 33-45.

Akula, W. G. Interaction & role congruency in the peer rating process - An empirical study. Doctoral dissertation, New York University, 1969.

Atkins, R. S. & Conlon, E. J. Behaviorally Anchored Rated Scales: Some Theoretical Issues. Working Paper #77-75-76. Carnegie Mellon University, 1976.

Bales, R. F. Task roles and social roles in problem-solving groups. In Eleon or E. Maccoby, T. M. Newcomb, & E. L. Hartley, Readings in Social Psychology, New York: Holt, Rinehart & Winston, 1958.

Bem, D.J. Self-perception: An alternative interpretation of cognitive dissonance phenomena. Psychological Review, 1967, 74, 183-200.

Calder, B. J. An Attribution Theory of Leadership. In B. M. Staw and G.R. Salancik (Eds.) New Directions in Organizational Behavior. Chicago: St. Clair Press, 1977.

Carroll, J.S.; Payne, J.W.; Frieze, I.M.; Sirard, D.C. Attribution Theory: An Information Processing Approach. Unpublished manuscript. Carnegie-Mellon University, 1976.

Carroll, J. S.; Payne, J. W. The Psychology of the Parole Decision Process: A Joint Application of Attribution Theory & Information - Processing Psychology. In J. S. Carroll & J. W. Payne (Eds.) Cognition & Social Behavior. New Jersey: Lawrence Erlbaun Assoc., Pub. 1976, 13-32.

Chemers, M.M., & Skrzypek, G. J. Experimental test of the contingency model of leadership effectiveness. Journal of Personality and Social Psychology. 1972, 24, 172-177.

Clarkson, G.P. E. Portfolio selection: A simulation of trust investment. Englewood Cliffs, N.J.: Prentice-Hall, 1962.

Crecine, J.P. A computer simulation model of municipal budgeting. Management Science, 1967, 13, 786-815.

Crowe, B. J.; Bochner, S.; Clark, A.W. The effects of subordinates' behavior on managerial style. Human Relations, 1972, 25, 215-237.

Davis, O.A. & Retuer, F.H. A Simulation of municipal zoning decisions. Management Science, 1972, 19, 39-76.

Dessler, G. & Valenzi, E.R. Initiation of structure and subordinate satisfaction: a path analysis test of path-goal theory. Academy of Management Journal, 1977, Vol.20, No. 2, 251-259.

Eden, D., & Leviatan, U. Implicit leadership theory as a determinant of the factor structure underlying supervisory behavior scales. Journal of Applied Psychology, 1975, 60 (6), 736-741.

Evans, M.G. The effects of supervisory behavior on the path-goal relationship. Organizational Behavior and Human Performance, 1970, 5, 277-298.

Farris, G. F., & Lim, F., Jr. Effects of performance on leadership choesiveness, influence, satisfaction, and subsequent performance. Journal of Applied Psychology, 1969, 53, (6), 490-497.

Fiedler, F. E. A contingency model of leadership effectiveness.In L. Berkowitz (Ed.) Advances in Experimental Social Psychology, Vol. 1, New York: Academic Press, 1964.

———A Theory of Leadership Effectiveness. New York: McGraw-Hill, 1967.

Fiedler, F. E. and Chemers, M.M. Leadership and Effective Management. Glenview, Ill.: Scott, Foresman and Company, 1974.

Filley, A.C., House, R.J., and Kerr, S. Managerial Process and Organizational Behavior. Glenview, Ill. : Scott, Foresman and Company, 1976.

Fleishman, E.A.; and Harris, E.F. Patterns of Leadership Behavior Related to Employee Grievances and Turnover. Personnel Psychology, 1962, 14, 43-46.

Gerwin, D., A process model of budgeting in a public school system Management Science, 1969, 15, 338-361.

——Information Processing, Data Influences, and Scientific Generalization. Behavioral Sciences, 1974, 19, 314-325.

Graen, G., Orris, J.B., & Allares, K.M. Contingency model of leadership effectiveness: some experimental results. Journal of Applied Psychology. 1971, 55, 196-201.

Jones, E.E.; Davis, K.E., Gergen, K.J. Role Playing Variation and Their Information Value for Person Perception. Journal of Applied and Social Social Psychology, 1961, 63, 302-310.

Herder, F. The Psychology of Interpersonal Relations, New York: Wiley, 1958.

Hill, W. A. & Hughes, D. Variations in Leader Behavior as a Function of Task Type. Organizational Behavior and Human Performance. 1974, 11, 83-96.

Hollander, E.P. Conformity, Status, and Idiosyncracy Credit. Psychological Review, 1958, 65 (2), 117-127.

——Leaders, groups, and influence. New York: Oxford University Press, 1964.

House, R.J.; Filley, A.C.; Kerr, S. Relation of Leader Consideration & Iniating Structure to R & D Subordinates Satisfaction. Administrative Science Quarterly. 1971, 19-30.

House, R. J.; & Mitchell, T.R. Path-Goal Theory of Leadership. Journal of Contemporary Business, 1974, 3, 81-97.

House, R.J.; Baetz, M.L. Leadership: Some Empirical Generalization & New Research Directions. In B.M. Staw (ed.) New Directions in Organizational Behavior: Volume II. Chicago, Ill.: St. Clair Press, in press.

Kelly, H. Attribtuion theory in social psychology. Nebraska Symposium on Motivation; 1967, 15, 192-238.

Kelly, H. Attribution in Social Interaction, Morristown, N.J.: General Learning Press, 1971.

Kelly, H. Causal Schematic and the Attribution Process. Morristown, N.J.: General Learning Press, 1972.

Lewin, A.Y., Dubno, P. & W.G. Akula. Face to Face Interaction in the Peer Nomination Process, Journal of Applied Psychology, 1971, 55, 495-497.

Lewin, A.Y. & Zwany, A. Peer Nominations: A Model Literature Critique and a Paradigm for Research. Personnel Psychology, 1976, 29, 423-447.

Lewin, A.Y., & Layman, S.S. Decision Process Models of Peer Nominations. ONR Technical Report No. 3, Contract N0014-76-C-007, 1977.

——Information Processing Models of Peer Nominations. ONR Technical Report No. 6, Contract N004-76-C-007, 1978.

——Information Processing Models of Peer Nominations. Forthcoming, in Personnel Psychology.

Lombardo, M.M. Looking at Leadership: Some Neglected Issues. ONR Technical Report #2. Contract No: N00014-76-C-0870. October, 1977.

Lord, R.G. Functional Leadership Behavior: Measurements & Relation to Social Power & Leadership Perceptions. Unpublished manuscript based on Doctoral dissertation, Carnegie-Mellon University, 1976.

Lowin, A., & Craig, J.R. The influence of level of performance on managerial style: An experimental object-lesson in the amerguity of correlational data. Organizational Behavior and Human Performance, 1968, 3, 440-458.

Lowin, A; Hrapchak, W.J., Kavanagh, M.J. Consideration and Initiating Structure: An Experimental Investigation of Leadership Traits. Administrative Science Quarterly. 1969, 238-253.

Maier, N.R.F. Problem Solving, Discussions and Conferences: Leadership Methods and Skills. New York: McGraw-Hill, 1963.

——Problem Solving and Creativity in Individuals and Groups. Belmont, Calf.: Brooks-Cole, 1970.

Mitchell, T.R., Larson, J.R., & Green, S.G. Leader Behavior, Situational Moderators and Group Performance: An Attributional Analysis. ONR Technical Report 75-76, Contract NR170-761, N0014-67-A-0103-0032, 1975.

Newell, A. On the analysis of human problem solving protocols. Paper presented to the International Symposium on Mathematical and Computational Models in the Social Sciences, Rome 1966.

Newell, A.; Shaw, J.C. & Simon, H.A. Problem solving in humans and computers. Carnegie Technical, 1957, 21, 34-38.

Newell, A. & Simon, H.A. Human Problem Solving. Englewood Cliffs, N.J.: Prentice-Hall, 1972.

Nisbett, R.E.; Wilson, T.D. Telling More Than We Can Know: Verbal Reports on Mental Processes. Psychological Review, 1977, 84 (3), 231-259.

Payne, J.W. Task Complexity and Contingent Processing in Decision Making: An Information Search and Protocol Analysis. Organizational Behavior and Human Performance, 1976, 16, 366-387.

Pfeffer, J. The Ambiguity of Leadership. Academy of Management, 1977, 2, 104-112.

Pfeffer, J. & Salancik, G.R. Determinants of supervisory behavior: A role set analysis. Human Relations, 1975, 28, 139-154.

Rush, M.C.; Thomas, J.C.; & Lord, R.G. Implicit Leadership Validity of Leader Behavior Questionnaires. Organizational Behavior and Human Performance, 1977, 20, 93-110.

Schrieshaim, C.A., Kerr, S. Psychometric Properties of the Ohio State Leadership Scales. Psychological Bulletin, 1974, 81, 756-765.

Secord, P.R., Dukes, W.F. & Bevan. W. Personality in Faces: I. An Experiment in Social Perceiving. Genetic Psychology Monographs. 1954, 49, 231-279.

Sheridan, J.E., Downey, H.K. & Slocum, J.W., Jr. Testing casual relationships of House's path-goal theory of leadership effectiveness. In J.G. Hunt and L.L. Larson (Eds.) Leadership Frontiers. Kent, Ohio: Kent State University Press. 1975.

Simon, H.A. Information Processing Theory of Human Problem Solving C.I.P. Working Paper No. 324. Carnegie-Mellon University, 1976.

Slovic, P. & Lichtenstein, S. Comparison of Bayesian and regression approaches to the study of information processing in judgement. Organizational Behavior and Human Performance, 1971, 6, 649-744.

Smith, Robert D. & Greenlaw, P.S. "Simulation of a Psychological Decision Process in Personnel Selection," Management Science, 1967, 18, B-409-419.

Staw, B.M. Attribution of the "causes" of Performance: A General Alternative Interpretation of Cross-Sectional Research on Organizations. Organizational Behavior and Human Performance, 1975, 13, 414-432.

Stephan, F.F.; Mishler, E.G. The Distribution of Participation in Small Groups: An Exponential Approximation. American Sociological Reivew, 1957, 17, 598-608.

Stogdill, R.M. Peronal Factors Associated with Leadership: A Survey of the Literature. Journal of Psychology, 1948, 25, 35-71

——Historical Trends in Leadership Theory & Research. Journal of Contemporary Business, 1974, 3 (4), 1-17.

Tagiuri, Renato. Person Perception. In Lindzey, Gardner, & Aronson & Elliot (Eds.) Handbook of Social Psychology, Mass: Addison-Wesley, 1969, 3, 395-449.

Taylor, J.C., & Bowers, D.G. The survey of organizations: Toward a machine-scored, standardized questionnaier instrument. Ann Arbor: University of Michigan, Institute for Social Research, 1970.

Vecchio, Robert P. An empirical examination of the validity of Fiedler's model of leadership effectiveness. Organizational Behavior and Human Performance, 1977, 19, 180-206.

Vroom, V.H. & Yetton P.W. Leadership and decision-making, London: University of Pittsburgh Press, 1976.

Weber, C. E. Intraorganizational decision processes influencing the EDP staff budget. Management Science, 1965, 12, 69-92.

Weissenberg, P. An investigation into the relationship between pscyhological differentiation, leadership style and interpersonal perception. Unpublished master's thesis. Cornell University, 1965.

Weissenberg, P.; Kavanagh, M.J. The Independence of Initiating Structure and Consideration: A Review of the Evidence. Personnel Psychology, 1972, 25, 119-130.