Technical Report No. 49

INDIVIDUAL DIFFERENCES, STRUCTURE, TASK, AND EXTERNAL ENVIRONMENT AND LEADER BEHAVIOR: A SUMMARY

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This research was sponsored by the Organizational Effectiveness Research Programs, Psychological Sciences Division, Office of Naval Research, under Contract No. N00014-67-A-0398-0012, NR 170-737.

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(1972 - 73)

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Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY *(Corporate author)*

The University of Rochester
Rochester, New York

2a. REPORT SECURITY CLASSIFICATION

Unclassified

2b. GROUP

3. REPORT TITLE

INDIVIDUAL DIFFERENCES, STRUCTURE, TASK, AND EXTERNAL ENVIRONMENT AND LEADER BEHAVIOR: A SUMMARY

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

Technical Report 49

5. AUTHOR(S) *(First name, middle initial, last name)*

Enzo R. Valenzi, John A. Miller, Larry, D. Eldridge, Priscilla W. Irons, Robert J. Solomon, Rudi E. Klauss

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
October, 1972	75	125

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
N00014-67-A-0398-0012	
b. PROJECT NO.	Technical Report No. 49
c. NR 170-737	9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*
d.	

10. DISTRIBUTION STATEMENT

This document has been approved for public release and sale; its distribution is unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY
	Organizational Effectiveness Research Programs, Office of Naval Research Arlington, Virginia 22217

13. ABSTRACT

This report summarizes a literature search conducted in the areas of individual differences, task characteristics, organizational structure, and external environment as they relate to leader behavior. The studies reviewed supported the notion that effective leader behavior was conditioned by complex relationships between personal variables and situational variables such as task characteristics. Problems in defining task variables were noted and classification schemes were reviewed providing suggested dimensions along which tasks vary. Research showed that task variables were important for determining effective leadership style. Definitions, problems, and properties of group and organizational structure were reviewed. The area is extremely complex and two conceptual problems are noted along with two recent models proposed to clarify the issues. Finally recent efforts to develop theory and data relating change in the external environment of organizations to leader behavior were summarized.

DD FORM 1 NOV 65 1473 (PAGE 1)

S/N 0101-807-6811

Unclassified

Security Classification

A-31408

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
leadership						
task						
organizational structure						
external environment						
personality						
individual differences						
group structure						
management style						

This report summarizes a literature search of studies conducted in the areas of individual differences, the nature of the task, organizational structure, and the external organizational environment as these areas relate to leader behavior. Because some of the areas are relatively "old," i.e., individual differences and properties of groups, no effort was made to review all the relevant studies done to date since several competent reviews already exist (e.g., Stogdill, 1948; Mann, 1959; Bass, 1960; Hare, Borgatta & Bales, 1966). Nature of the task, organizational structure, and the external environment are relatively new or unexplored areas and thus were given more complete coverage. Each area will be treated below in a separate section.

INDIVIDUAL DIFFERENCES

Historically the individual difference approach to the study of leadership has its foundations in the so called "Trait Theory" of leadership. Very simply the basic notion was that successful leaders possessed more of, or different traits, than followers or than less successful leaders. The appropriate research strategy therefore should consist of three steps: (a) conceptual identification of the important leader traits (b) development of adequate methods to measure the traits (c) validation of the measures, usually by the criterion group method.

While the theory and method are deceptively appealing, the trait approach unfortunately has not resulted in significant advances in the study of leader behavior. In the first place it is not easy to agree on what traits are or should be important for the successful leader. The number of traits proliferates very rapidly, reminiscent of the instinct theory of behavior in the 19th century. For example, in one study 100 trait characteristics were identified (Randle, 1956). Eventually, through data analysis, these were reduced to 8 basic qualities but the study does illustrate the proliferation problem.

There is, as always, the measurement problem. Given so many traits it is hardly possible to develop psychometrically sound measures for all of them. The current status of personality measurement attests to the seriousness of this problem. There are literally thousands of personality tests, but they do not all measure different aspects of the individual. In fact for most of them it is difficult to say exactly what they do measure. It is not uncommon to find disagreement where agreement is expected and vice-versa. Essentially the problem reduces to one of construct validity and prompted Campbell and Fiske (1959) to propose the method of convergent and discriminant validation to clarify the status of specific measures.

Several reviews of the literature have been done (Bird, 1940; Jenkins, 1947; Mann, 1959, Stogdill, 1948) summarizing the research relating leader traits to leadership behavior or leadership status. The general interpretation of these studies by theorists is that the trait approach is not a viable issue any longer (e.g. Fiedler, 1971). What happened was that the opposite extreme view was taken, namely that effective leadership was situational in origin and not a function of the

leader's personality traits. The extreme situational view was not warranted, even based on the reviews noted above. Stogdill quite specifically pointed out that patterns of leadership traits varied with the situation. That is, leader traits are important, but the same ones are not important in all situations for all leaders. The statement is more appropriately interpreted as directing researchers to look for the dimensions that define situations and learning how these dimensions interact with relevant leader attributes to result in effective behavior. In fact, this is beginning to happen. Hollander (1971) has noted that, "Today there is a resurgence of interest in the characteristics of people who fill organizational roles". An example of a situational-personality interaction model is found in Fiedler's (1971) work, although his exclusive use of the least-preferred-coworker scale as a measure of the leaders' personality seriously hampers the generality of his results. In the sections to follow a number of personality dimensions that have received the most attention in recent research or theorizing will be summarized.

Authoritarianism

The investigation of the personality trait, authoritarianism, as measured by the F-scale (Adorno, Frenkel-Brunswik, Levinson & Sanford, 1950) has received considerable attention with regard to leadership situations. Vroom (1959, 1960) in an often cited study found that the relationship between a participative style of supervision and subordinates' satisfaction and effectiveness varied with two personality characteristics of the subordinates - authoritarianism and need for independence.

The correlation between degree of job participation and job satisfaction was highest for those with both a high need for independence and low F-scale scores. In fact, Vroom found a correlation of .73 for this group. For the other three groups (high need for independence-high F score, low need for independence-low F score, low need for independence-high F score, the correlations were .25, .12, and .04 respectively and all were nonsignificant. A similar result was found for ratings of effectiveness by supervision instead of job satisfaction though the correlation for the high need for independence-low F score group was only .34 ($p<.05$). Campion (1968) replicated Vroom's results in an experimental study. A replication of Vroom's study by Tosi (1970) using the same survey method as Vroom with a different organization and different jobs failed to corroborate Vroom's findings. Tosi noted that his subjects were probably quite different from Vroom's in terms of values, interests, and personality characteristics as well as sex.

Vroom and Mann (1960) examined the relationship between authoritarianism of the supervisor and satisfaction of the subordinates. Their subjects were 28 groups with approximately 50 subjects per group. They found that workers whose jobs were characterized by a high degree of interaction between workers and supervisors, and by a high degree of interdependence possessed more positive attitudes about equalitarian leaders. Four out of five dependent measures of satisfaction, for workers whose jobs were of this type, were negatively correlated with supervisor F-scale score, two of which were significant ($p<.10$, $p<.05$).

Employees in work groups in which interaction was restricted and where the work was highly independent possessed more positive attitudes towards authoritarian leaders. All five dependent measures of satisfaction for workers whose jobs were of this type were positively correlated with supervisor F-score, three of which were significant ($p<.05$). This finding is important because it suggests that while the personality of the leader is important it depends on the situation as defined by task interdependence and degree of interaction between supervisor and subordinate. Haythorn, Couch, Haefner, Laugham, and Carter (1956) administered the F-scale, the 16PF, and the MMPI. They then formed two groups, one high on the F-scale, high on conservatism, and normal, while the other was low on the F-scale, liberal, and normal. Each group contained 32 subjects. The subjects then viewed a film and met in their groups to compose dialog for the film. Pairs of observers rated the subjects on 16 behavior variables. The average interobserver reliability was .75, with a range from .31 to .91. Emergent leaders were picked by subjects' ratings. Using t tests it was found that there were significant differences ($p<.05$) on seven of the sixteen variables. Low F leaders were significantly more sensitive to others, showed more leadership, contributed more towards moving the group closer to goals set by the group, showed greater effective intelligence, and were more submissive in attitudes towards other group members, than were high F leaders.

Haythorn et al. (1956b) using the same design as above, found that high F leaders were less equalitarian, more autocratic, and less

sensitive to others. They found that high-F followers were more satisfied with appointed leaders and were less critical of their own group's performance. With low-F leaders, both high-F and low-F followers exerted more influence, and expressed greater differences of opinion. They also found that followers were more secure in homogeneous groups. In both high-F and low-F groups there was less personality conflict if the groups were homogeneous. This last conclusion was based on observer ratings (average r = .75), but was not supported by subjects' ratings.

Tosi (in press), building on the Haythorn et al. studies, inferred that a congruency hypothesis might be operating such that a personality match between the supervisor and subordinate would result in higher satisfaction and morale, and less conflict than a mismatch. Data were collected from 488 managers of consumer loan offices on a variety of measures including the F scale, tolerance for freedom scale from the LBDQ XII, participation scale from Vroom (1959), job satisfaction scale from Vroom (1960), and the job threat and anxiety scale, an a priori scale. Four groups were formed, high-F and low-F groups who worked for bosses either high or low on tolerance for freedom. The congruency hypothesis predicted that high-F subordinates and low tolerance for freedom bosses or low-F subordinates and high tolerance for freedom bosses would result in a situation with more satisfaction less conflict, and higher effectiveness than in a mismatch situation (i.e., high-F subordinates and high-tolerance for freedom bosses and low-F subordinates and low tolerance for freedom bosses).

The congruency hypothesis was partially supported with job satisfaction and degree of participation highest for the high-F subordinate working for the low tolerance for freedom boss. The second part of the congruency hypothesis concerning a low-F subordinate and high tolerance for freedom boss was not supported; in fact this group reported the lowest level of participation and satisfaction. Thus incongruent situations had higher levels of satisfaction and participation than one of the congruent situations. The implication of these results seems to be that some degree of structure or direction must be present, whether in the boss or in the subordinate, to define the situation in which work is done. This finding is consistent with those of Vroom and Mann (1960) noted above. Where a high degree of interaction between subordinates and supervisor and high task interdependence were obtained, then the boss could be more equalitarian, for under those conditions there was sufficient structure to facilitate task accomplishment. In the opposite set of conditions one might argue that the boss had to use what interaction time he had to structure the task since there were no other opportunities to do so by him or through other workers.

Bass (1967) found that authoritarian type leadership had different effects depending on the orientation of the subordinate. Task oriented subjects produced greater quantities of work under permissive leadership while interaction oriented subjects produced greater quantities under coercive leadership.

Finally in his literature review Mann (1959) found that 17 out of 22 significant results relating conservatism and leadership showed a negative relationship.

Intelligence

Stogdill (1948) reported seventeen studies relating measures of intelligence to various measures of effective leadership. The correlations were consistently positive with an average correlation of .28. Mann (1959) reviewed 28 studies and found that 91 of 92 significant results showed a positive relationship between intelligence measures and leadership. The average correlation (median r=.25) was of the same order as that found by Stogdill. Ghiselli (1966) reviewed the literature on the prediction of proficiency of managerial and executive jobs. Many heterogeneous studies using diverse measures of intelligence and personality and equally diverse measures of leader proficiency were averaged. Again the average correlation between intelligence and leader effectiveness was between .25 and .30. In a similar review Korman (1968) summarized nineteen studies on the prediction of managerial performance and concluded that intelligence, as measured by verbal ability tests, was a fair predictor of first-line supervisors performance but not of higher level managerial performance. The median correlation reported in Korman's summary table for managers was .26, but this value does not include 6 studies where the correlation value was not reported, 4 of which produced negative results.

As Korman indicated intelligence may not be a particularly good predictor of leadership potential because of the screening process which higher level managers undergo. Those who lack intelligence to some degree are not promoted resulting in the attenuation of the correlation of other variables e.g., effectiveness, with intelligence. Attenuation due to this restriction of range probably also affected the magnitudes

of correlations reported by Ghiselli so it may be proper to consider them as underestimates.

Another of Stogdill's findings was that, based on five "competent" studies, extreme discrepancies between the intelligence of leaders and followers hindered the exercise of effective leadership. The mechanism suggested by Stogdill was that communication between leader and follower was adversely affected by large differences in intelligence.

A study by Ghiselli (1963) supported the notion of a curvilinear relationship between intelligence and effectiveness. He found that managers with low and high scores on the Analysis of Relationships test, a high level power test, had a lower probability of success than managers with intermediate scores. Ghiselli did not calculate an index of curvilinear relationship i.e., eta but plots of his data were markedly inverted U-shaped.

Mahoney, Jerdee, and Nash (1961) divided 468 managers from various industries and job levels into 3 groups based on effectiveness ratings by superiors. The Wonderlic Personnel Test, a measure of general intelligence, yielded a chi-square value significant at the .10 level in a two-way classification with rated effectiveness.

Rowland and Scott (1968) used the Purdue Adaptability Test form A as their measure of intelligence. Superiors rated the performance of the supervisors work groups on a 10-point scale for amount of work done and quality of work. There were 58 supervisors and 673 subordinates. Worker satisfaction was measured by a semantic differential for the following categories: "me at work", "my supervisor", "successful",

considerate, my job, my pay, fringe benefits, fellow workers, working conditions, my growth opportunities. All correlations with the intelligence measure were nonsignificant.

Izard (1959) gave the Aviation Classification Test, a measure of "scholastic aptitude or general intelligence", and the Mechanical Comprehension Test to 330 cadets entering the Naval Air Training Program. Sociometric measures of leadership were gathered by peer nomination on a form describing leadership behavior and asking subjects to nominate the three most qualified to be leaders and the three least qualified to be leaders. Choices were made from 20 man groups within which subjects worked and lived for thirteen weeks. The correlation between ACT and sociometric measure was significant at the five percent level; however the correlations themselves were not given. Possibly the correlations were small, and significance was due to the large sample size.

Kiessling and Kalish (1961) tested 87 candidates to the Honolulu Police Academy with the Otis Self Administering Test of Mental Ability. Subjects were rated on their performance in leaderless group discussions. Median interrater reliability was .65 with four raters rating each group, with the raters changed for each of the three sessions. Overall ratings correlated with Otis intelligence .35, $p=.01$.

Ghiselli (1963) administered the Self Description Inventory to subjects who worked at different jobs ranging in level from district manager of an insurance company to line workers. He also used

the Perceived Occupational Level Scale to establish the subjects' level in the company. The rank order correlation between intelligence score and occupational level was .85. Rank order correlation between intelligence score and occupational level as determined by the test was .76.

Ghiselli (1959) administered the Self Description Inventory (SDI) to 113 subjects holding top management positions, 176 middle level managers, 172 lower level managers, and 319 line workers. He found that the intelligence scale of the SDI correlated .57 with IQ tests. The following differences were significant at the one percent level or less for correlations between intelligence and work level: middle level and low level managers, top level and lower level managers, top level managers and line workers, and middle level managers and line workers.

Rychlak (1963) administered the SCAT and the Wonderlic to 84 male managers in the New York Telephone Company. Subjects participated in a manufacturing problem and a discussion problem. Subjects were rated on five dimensions by observers and they also rated themselves. Average observer reliability for the manufacturing problem was .77, and for the discussion problem it was .82. Total leadership observer scores correlated with the Wonderlic .28 ($p=.05$), and peer scores correlated .37 ($p=.01$). SCAT verbal quantitive and total were significantly correlated with observer ratings at the one percent level as were the scores with the peer ratings.

Miscellaneous Personality Variables

This section summarizes a number of studies dealing with selected personality variables and their relation to aspects of leader behavior. Only a few recent studies for each personality trait are summarized.

Richardson and Hanawalt (1943, 1952) and Hanawalt and Richardson (1944) did a series of studies investigating the relationship of dominance, as measured by the Bernreuter Personality Inventory, to the holding of a leadership position. They compared office holders and nonoffice holders in student groups, supervisors and nonsupervisors in industrial groups, and office holders and nonoffice holders in a female social activities group. In all comparisons they found that those holding positions of leadership had significantly higher dominance means than those not in the leadership positions.

Megargee (1966) used the dominance scale of the California Psychological Inventory to see how instructions would affect high dominance and low dominance subjects in assuming the leadership role. He used 25 pairs of introductory psychology students, with one member of each pair having a high dominance score and one member having a low dominance score. He presented them with a bolt removing task requiring cooperation, and leadership by one of the pair. Under unstructions emphasizing the task, 56% of the high dominance subjects assumed the leadership role. However, under instructions emphasizing the role, as opposed to the task,

the high dominance subjects assumed the leadership role in 18 of the 20 pairs used in this second experiment ($p=.001$). He concluded that dominance is manifested under certain conditions in which leadership is salient.

Ashour and England (1971) used the dominance scale of the Personality Research Form, form AA. The reliability for the parallel form BB is .88, and the parallel form reliability with a two week interval is .92. They investigated the amount of discretion, or power equalizing behavior, which a leader would assign to a subordinate. One hundred one college junior and senior students were subjects, Two months after the personality questionnaire was administered they had the subjects assign discretionary and nondiscretionary tasks to hypothetical high capacity subordinates and to hypothetical low capacity subordinates. Analysis-of-variance showed a significant relationship ($p<.05$) between leader dominance and assigned level of discretion. In addition leader dominance correlated .23 ($p<.05$) with subordinate's assigned level of discretion. The experimenters hypothesized that dominant leaders tended to assign nondiscretionary tasks to subordinates as a means of asserting their position.

Mann (1959) reported that 15 of the 21 significant results included in his review showed a positive relationship between dominance and leadership. The median correlation was about .20.

Doyle (1971) studied the effects of achieved status of leaders on the productivity of groups. He sent attitude questionnaires to 27

schools to obtain ratings on the achieved status of the principal. After dividing the schools into high, moderate, and low achieved status of the principal, he formed a problem solving group in each school composed of the principal and three teachers. They worked on the Doodlebug problem and productivity was defined as the numberof common beliefs overcome by the working group. Leaders with low and moderate achieved status produced more ideas (p=.005). Group productivity did increase for the high status groups in the convergent phase. In other words high achieved status was conducive to problem solving, but only after it was one of coordination.

Haythorn (1953) investigated the effect that individual members can have on the characteristics of small groups. He used 16 NROTC subjects and had them do several tasks in small groups. He then rotated the subjects so as to isolate the effects of individuals from groups. Observers rated the behavior of subjects on twelve behavioral characteristics, such as cooperativeness, aggressiveness, efficiency etc. interobserver reliability ranged from .10 to .98 with an average of .86. He also administered the 16 PF. Factor analysis of behavioral ratings revealed two factors. Factor I was composed of patterns of cooperativeness, efficiency, and insight, which facilitated effective group functioning. Factor II was composed of aggressiveness, self confidence, initiative, interest in individual solutions, and authoritarian behavior. This factor did not facilitate group cohesiveness. Personality traits of maturity, adaptability, and acceptance of others were positively related to smooth and effective group functioning.

Aspiration has also been found to be related to leadership. Gordon and Medland (1965) used two companies of army recruits (N=246 and N=229). Each company was composed of 20 squads. He administered the Leadership Scale of the Survey of Interpersonal Values, which measures the importance that one places on being in an important position. He then measured peer ratings after the first four weeks of basic training. Each subject rated everyone else in his squad on a seven point leadership ability scale. The squads within each company were then completely reconstructed and another assessment was made after another four weeks. The correlations between leadership aspiration and peer ratings of leadership ability after the first four week period were .22 and .34 for the two companies. Correlations after the second four week period were .27 and .34. All correlations were significant ($p < .01$).

Day and Hamblin (1964) in a laboratory experiment found that aggressive feelings toward the supervisor under a condition of close as compared to general supervision was mediated by the self-esteem of the subordinate. Only subordinate of low self-esteem increased aggressive feelings against supervision as the result of close supervision.

Runyon (in press) investigated the interaction of management style and the personality variable, "locus of control," on workers' satisfaction with supervision and job involvement in a large, multiplant chemical company.

There was a significant interaction between management style ratings and scores on the I-E (internal-external) scale which

measures the locus of control of an individual. Those employees who tended toward external control were more satisfied with directive supervisory style and those who tended toward internal control were more satisfied with participative supervisory style. There also was a relationship between the I-E measure and job involvement. Those who tended toward internality had significantly more job involvement under both styles of supervision than those who tended toward externality. The results were interpreted as evidence that the personality of subordinates is an important variable in supervisor subordinate relationships and that management style alone is not sufficient to account for differences in employee satisfaction.

While the studies reviewed here are not in any sense exhaustive, they do represent the trend which research on the personality correlates of leader behavior has taken in recent years. It appears that the trait approach, in the sense of seeking a particular trait or pattern traits required for successful leadership is not a viable issue any longer.

Conceptualization of the relationship between personal variables and leader behavior has matured since 1940 and accordingly research designs have become more sophisticated. Thus an increasing number of studies find interactive or curvilinear relationships among personal variables and situational variables (e.g., task characteristics, occupational level, degree of structure). This trend was suggested by Stogdill (1948) over twenty years ago. Similarly Bass (1960, pp. 17-20) stated clearly the importance of individual and situation interaction.

TASK

This section will consider the nature of the task as a situational variable in a contingency theory of leadership behavior. We will discuss briefly some theoretical approaches to defining the term "task" which apply to group and leadership research, and also review various characteristics of tasks which might be important for understanding group and leader behavior. In addition, we will summarize specific studies which directly or indirectly suggest some patterns in linking task characteristics to leader behavior and their interaction effect on effectiveness criteria such as productivity and satisfaction of group members.

Definitional and classification issues

The relative importance of task as a variable in group and leadership behavior has been recognized for many years (Bass, 1960; Thibaut & Kelley, 1959; Carter & Nixon, 1949), but for the most part task factors have not been systematically included with other situational variables in leadership theory and research. (Some recent exceptions to this pattern can be found in studies by Wofford (1971), Heller & Yukl (1969), and Fiedler (1964)). As Altman (1966) suggests, too often task is treated as a control variable. In order to gain a greater understanding of the impact of task on group and leader behavior, this factor should ideally be treated more often as an independent variable in the design of experiments.

Perhaps one of the key reasons why task variables have tended to be given relatively little emphasis is that this concept is a rather illusive one which allows for differing interpretations, definitions, and classification systems depending on one's perspective and research interests.

Every approach and classification system generates its own set of task characteristics which is difficult to compare with other sets of characteristics, and hence attempts to treat this variable in a systematic fashion are easily frustrated. Some of the various ways of looking at the concept of task are briefly discussed below.

Some researchers stress the importance of distinguishing between objective and subjective characteristics of tasks. Objective features of tasks are those which can be defined in physical or measurable terms by the investigator or observer. Shaw (1963) represents this approach in his work on empirically derived task dimensions. (Some of his results will be discussed below). Other researchers stress the importance of subjective perception of the task--as viewed by those who will perform the task, rather than as seen by the person assigning the task. Hare (1962, p. 248), for example, says that "task is, in the most pertinent sense, what the group members define it to be as they respond to the situation in which they find themselves. Thus task should not be narrowly viewed in terms of what the experimenter intends or what some objective sense of the situation apparently demands." Hackman (1969) approaches this issue of objective and subjective task characteristics somewhat differently by including both objective task input and subjective input (he uses the term "task redefinition" for the subjective aspect) in his framework for analyzing task effects.

Another distinction which has been made in defining characteristics of tasks is the differentiation of objective task properties and modal properties (Roby & Lanzetta, 1958). Objective properties as mentioned

earlier are those which the observer or experimenter can specify in terms of physical or measurable values, while modal properties refer to typical performer behavior, subject to variations in group characteristics and their possible interaction effects with other task or situational variables.

Other perspectives and approaches to describing tasks have also been proposed. Thibaut and Kelly (1959) suggest that an analysis of the interdependency and power relationships between a person and the task allows for a comprehensive statement of task characteristics. Roby and Lanzetta (1958) in a theoretical paper propose a paradigm of four event classes, task input variables, group input activities, group output activities, task output variables in the external environment; and three types of event properties, descriptive aspects, distribution of the component events, and functional behavior events as a framework for isolating group-task characteristics. Altman (1966) suggests coding tasks in terms of the specific behavioral requirements necessary to complete a task and on the basis of several participant relationship dimensions, status relationships, task dependency linkages, temporal linkages, and directional linkages, which modify the behavioral requirements dimension.

In perhaps one of the most thorough and recent discussions of this issue, Hackman (1969) suggests that most of the various approaches to describing and differentiating tasks can be grouped under four general headings:

1. task qua task - the objective, physical, real world dimensions of tasks;

2. task as ability requirements - specifying the technical and personal abilities required to successfully complete a task;

3. task as behavior description - what a performer of the task actually does - his typical behaviors;

4. task as behavior requirement - what a performer should do to successfully complete the job (similar to Steiner's task demands (1966), Roby & Lanzetta's (1958) critical demands, and partially similar to Altman's (1966) approach).

Hackman concludes that the fourth approach (task as behavior requirement) is the most useful way of differentiating tasks. This view is somewhat similar to Miller's (1966) who sees task descriptions as statements of human performance requirements. Hackman goes on to define the concept of task as follows:

> "A task may be assigned to a person (or group) by an external agent or may be self-generated. It consists of a stimulus complex and a set of instructions which specify what is to be done vis-a-vis the stimuli. The instructions indicate what operations are to be performed by the subject(s) with respect to the stimuli and/or what goal is to be achieved." (p.113)

Thus he views tasks as having three key elements; stimuli, instructions concerning operations to be performed, and instructions as to what goals are to be achieved.

In short, as the above discussion suggests, the notion of task can be legitimately viewed from a number of different perspectives. Consequently, the specific dimensions or characteristics of tasks which different researchers have suggested and/or used in their work have varied quite widely. In the section which follows we consider in more detail

some specific task classifications and characteristics which have been used in group and leadership research.

Classification Schemes and Specific Task Characteristics

Innumerable sets of specific task dimensions could be generated and listed here but we will concentrate primarily on those which have been more frequently referred to and/or used in small group research and field studies in organizational settings.

Probably one of the most extensive efforts to empirically isolate task dimensions can be found in Shaw's (1963) factor analytic study in which he derived six empirical dimensions from a collection of 104 group tasks. The six dimensions are difficulty, cooperation requirements, solution multiplicity, intellectual-manipulation requirements, intrinsic interest, and population familiarity. Of these six dimensions, the first three were seen by Shaw to be particularly promising for understanding group processes. Some of these dimensions have been used in subsequent empirical studies (Shaw & Blum, 1966; Morris, 1966) and additional, more extensive use of them in the future would probably serve as a helpful step in furthering our understanding of the impact of task on human behavior.

At a somewhat different level, task analysis has been applied to industrial settings by attempting to identify key dimensions or functions involved in particular jobs and job titles. In an exploratory study using data of the U.S. Employment Service, Orr (1960) analyzed 4000 jobs selected from the Dictionary of Occupational Titles on the basis of eight aptitudes deemed necessary for successful job performance. Using the

Distance (D) Measure as a statistic for clustering jobs he came up with 6 clusters the content of which revealed a differentiation in terms of intellectual-supervisory, mechanical-manual, and clerical jobs, with additional differentiation based on level of aptitudes required for success.

Fine (1963) in a theoretical discussion of work behavior suggests classifying jobs according to three broad catagories; things, data, and people. That is, work or jobs can be viewed in terms of the relationship of the worker to things (machines, tools, etc.) through which work gets accomplished, to data (information, ideas), and to people (subordinates, superiors, clients, customers, etc.) to whom the worker relates.

Looking at task characteristics more directly in terms of effect on leadership behavior, Carter, Haythorn and Howell (1950) introduced six types of tasks (reasoning, intellectual construction, clerical, discussion, motor cooperation, mechanical assembly) into leaderless small groups. Correlations computed between leadership ratings and the six tasks were almost all positive, and were interpreted as indicating a certain generality of leadership performance across all tasks. However, there were also two observable groupings among tasks which suggested that different kinds of task situations required different leadership abilities. A centroid factor analysis revealed two factors which were named "intellectual leadership" and "doing things with one's hands." A similar finding was reported in an earlier experimental study by Carter and Nixon (1949) which involved three types of tasks (intellectual, clerical, and mechanical

assembly) in leaderless groups. The results indicated that leadership in certain intellectual and clerical tasks tended to be independent of leadership of mechanical assembly tasks.

Another approach to classifying tasks in relation to leadership behavior is revealed in a study by Heller and Yukl (1969) who tested decision centralization patterns for six management functions (production, finance, purchasing, sales, personnel, and general managers). Their sample included 82 senior managers from 15 large companies, 28 first line supervisors and 72 second line supervisors from three of the 15 companies, and 21 student leaders from a large university. With regard to decision centralization patterns for the six management functions, they identified three clusters, the production and finance managers tended to use centralized decision-making styles, the nonspecialized general managers and personnel managers tended to be most participative, the purchasing and sales managers were in between on this dimension. An analysis of variance on these three clusters showed a mean decision centralization score significantly different at the .05 level, although the F test for the six individual functions was not significant.

Several specific task features have been identified and/or empirically tested over the past several years in group and leader behavior research. For example, the notion of structured versus unstructured tasks has been considered in a number of studies (Fiedler, 1964; Hunt, 1967; Shaw & Blum, 1966; Wofford, 1971). The distinction between uniform and nonuniform tasks has also been stressed by some researchers (Litwak, 1961; Hall, 1962).

Related terms (recurring vs nonrecurring, programmed vs nonprogrammed, routine vs nonroutine) have also been applied to the same general distinction made between tasks which are standardized and repetitive versus those which are not so predictable or standarized.

Another type of distinction which is occasionally made is between mental and physical activities. One of Shaw's (1963) dimensions differentiates intellectual from manipulative activities. A similar kind of contrast was arrived at in Carter, Haythorn and Howell's (1950) factor analytic findings of leader requirements.

Still other types of task characteristics have been suggested in the literature. Convergent vs divergent tasks (Bass & Barrett, 1972; Doyle, 1971; Shaw & Blum, 1966), discrete vs continuous type tasks (Miller, 1966; Woodward, 1965), interdependency requirements (Vroom & Mann, 1960; Shaw, 1963; Bass & Barrett, 1972), and degree of task complexity Bell, 1967; Alderfer, 1969; Shaw, 1963).

Although these task dimensions do not provide a comprehensive listing of possible items, they do give a representative picture of the more frequently cited task characteristics discussed in the literature. Before looking at some of the study findings related to these dimensions, it might be useful to consider briefly some of the specific leadership styles and organizational criteria most often involved in this type of research.

Leadership styles and organizational criteria

Leadership research has included a number of different leader behavior classifications. The most widely known leader behavior dimensions

in this area are initiation of structure and consideration (Stogdill & Coons, 1957). Similar constructs have been developed by other researchers which reflect pretty much the same two dimensions (people oriented vs production oriented - Blake & Mouton, 1964; employee centered vs job centered - Likert, 1964). Yuki (1971) suggests a three factor approach (consideration, initiation of structure, and decision centralization) while Wofford (1971) expands his framework of leader behavior to five factor analytically derived behavior dimensions (group achievement and order, personal enhancement, personal interaction, dynamic achievement, security and maintenance). Bowers and Seashore (1966), after reviewing many studies, suggest a four factor theory for classifying leader behavior; support, interaction facilitation, goal emphasis, and work facilitation.

Still other researchers focus more specifically on the power sharing dimension, especially in terms of decision making. Tannenbaum and Schmidt (1958) suggest seven styles of leader behavior on a continuum ranging from boss-centered to subordinate-centered decision making. This continuum has been since modified by some researchers (e.g. Sadler & Hofstede, 1969) to four styles (tells, sells, consults, and joins). Lippitt and White (1960) suggest three basic styles (authoritarian, democratic, and laissez-faire) while Likert (1961, 1967) identifies four leader styles (exploitative-authoritarian; benevolent-authoritarian, consultative, participative). Heller and Yukl (1969) utilize still another set of decision procedures involving five styles (own decision without explanation, own decision with explanation, consultation, joint decision making, and delegation).

The organizational effectiveness criteria against which leadership styles and interactions with task variables are measured usually fall into two general categories, productivity measures and satisfaction or morale measures. In the case of productivity, employee ratings as well as more objective data such as production records (number of units turned out, etc.) are frequently used. Satisfaction and morale measures are often obtained through employee attitude questionnaires and company records on turnover or grievance rates.

It is with these kinds of criterion data that task and other situational variables are linked to leader behavior in the effort to understand better the process of effective leadership. Having briefly looked at task characteristics, leader behavior styles, and organizational criteria, we will now consider some specific studies to see what general patterns seem to emerge from considering these three sets of factors.

Specific research findings - patterns of effectiveness

The discussion which follows will focus on specific task variables and relate them to various leader behavior styles (and to organizational criteria where indicated) as reported in various studies. The key task variables discussed are: structure, routineness, complexity, intellectual-mechanical and interdependency requirements. This list is certainly not exhaustive, nor are the individual variables necessarily independent of each other. However, they do represent categories which have been dealt with extensively in the literature.

Structure. Fiedler (1964) incorporates the dimension of task structure in his contingency model, postulating that directive leadership

behavior is more effective when the group-task situation is very favorable or very unfavorable to the leader, while participative leadership is most appropriate in the intermediate range of favorability. In terms of task, he defines a high degree of structure as one of the elements in making the situation favorable to the leader while a highly unstructured task contributes to an unfavorable situation. Thus, highly structured and highly unstructured tasks would call for directive leadership and participative leader behavior would be more suitable for moderately structured tasks (assuming leader-member relations were also appropriately contributing to the favorableness or unfavorableness of the situation). Fiedler found confirmation for his model in a study conducted with Belgian sailors (1966), and other studies discussed below have since tested the usefulness of this model.

Shaw and Blum (1966) conducted a laboratory experiment manipulating task structure by using three problems which were rated high, medium, or low on a solution multiplicity dimension using scale values determined by Shaw (1963). The results showed that directive leadership was more effective in structured task situations while nondirective leadership was more effective in moderate and low structured conditions. Individual t tests revealed significant differences in leader styles in the moderate and highly structured situations ($p<.01$) but not for the highly structured situations. Thus, the results only partially confirmed Fiedler's model.

Hunt (1967) tested Fiedler's model in three organizations where he differentiated between coacting and interacting groups, and he found that

the model generally predicted performance as expected for both types of groups. Task structure by itself and in interaction with leader member relations was generally consistent with the model but did not play a large role in the results. In fact, the leader member relations dimension by itself seemed to have equivalent predictive power.

Hill (1969) also tested Fiedler's model with coacting and interacting groups in two organizations - an electronics firm and a fairly large hospital. The results, although not statistically significant, were in the predicted direction and thus provided further tentative support for the model.

Lawrence and Lorsch (1967) also reported some findings regarding structure which they concluded appeared to follow the pattern suggested by Fiedler's model. In looking at four subsystems (fundamental research, applied research, sales, and production) in six organizations they found that production personnel (whose work was most certain) and fundamental research personnel (whose tasks were least certain) both preferred task oriented styles, while members in the sales subsystem (which had moderately certain work) preferred more socially oriented interpersonal styles.

Fiedler (1971), in an extensive review of empirical findings regarding his contingency model, listed additional studies (both laboratory and field) which seemed to provide general support for the model. Most of the findings tended to be in the predicted direction, although only a few of the results were significant at the .05 level or better.

In two other direct tests of Fiedler's model, less enthusiastic conclusions were drawn (Graen, Alvares, Orris, & Martella, 1970; Graen,

Graen, Orris, & Alvares, 1971). The results of both of these studies failed to support model predictions and the authors concluded the usefulness of the model was questionable.

Other studies besides those testing Fiedler's model have also considered task structure. Wofford (1971) found that the managerial behavior dimension labelled, group achievement and order, was significantly related to unstructured tasks (partial $r=.42$, $p<.01$) in small group situations.

Assuming that research and development work situations generally can be classed as moderate to low in structure, a few other study results can be included in this section. Lawler and Hall (1970), in looking at the relationship between job involvement, satisfaction, and intrinsic motivation among a sample of 291 scientists, found that a job which allowed the person greater control over his work, and opportunity for creativity (in a sense, less structured jobs), and was appropriate to his abilities, brought greater satisfaction. Relationships with performance, however, were not very strong.

In another study with scientists in government R & D labs, Baumgartel (1957) studied attitudes and motivations of scientists under three leadership conditions (democratic, directive, and laissez-faire). He found that scientists working under the participative-democratic climate held the most favorable attitudes and greater job motivation while least favorable attitudes were found with persons working under the directive leadership (with laissez-faire in between).

House, Filley and Kerr (1971) looked at satisfaction in R & D labs in relation to leader consideration and initiation of structure. As expected, they found a positive relation between perceived leader consideration and subordinate role satisfaction in three separate companies (14 of 24 relations were significant at the .01 level). However, there was also a generally positive relationship between initiation of structure and satisfaction.

The various findings which have been reported above with regard to task structure, although not overwhelmingly conclusive, suggest that when a task is highly structured, directive leadership will be more effective, while participative styles may be appropriate in less structured job situations.

Routineness. The degree of routineness has also been viewed as important task variable. Related terms such as uniform vs. nonuniform, recurring vs. nonrecurring, programmed vs. nonprogrammed, are also relevant to the general distinction between repetitive, routine types of activities vs. tasks which involve considerable variety.

Pelz cited in Litwak (1961), in a study which distinguished uniform vs. nonuniform tasks, found a higher correlation between motivation to work and productivity when those engaged in nonuniform tasks were free to make their own job decisions. For uniform task situations there was a higher correlation between motivation and productivity when freedom to make decisions was restricted.

In a study involving 16 departments in 10 organizations, Hall (1962) also explored task routineness. He distingulshed between type I (uniform,

easily routinized, standardized, traditional type skills and activities) and type II tasks (nonuniform, difficult to routinize, creative type activities) and found that departments and hierarchical levels which were more type II in nature were less bureaucratic than those departments and levels which were oriented toward type I task activities (e.g. in type II situations the atmosphere was more personal, had less hierarchical emphasis, fewer procedures and regulations, etc.). Hall's study was stimulated by Litwak's (1961) theoretical paper which proposed a three model approach in the study of organizations (Weberian bureaucratic model, human relations model, professional model). Litwak suggested that the Weberian model was most efficient in situations involving uniform type activities and traditional areas of knowledge while the human relations model would be more efficient in handling nonuniform events and occupations stressing social skills.

Heiler and Yuki (1969) tested decision centralization patterns of managers in six different functional areas and found that production and finance managers tended to use centralized decision-making while general and personnel managers were more permissive. These researchers proposed that this finding might be due to the fact that managers in finance and production had more standardized, programmed types of jobs, permitting less freedom and flexibility which allowed for less meaningful participation. Thus, to some extent, their findings tend to fit into the pattern of other studies distinguishing tasks of a routine, programmed nature from those which are more varied, flexible and nonroutine.

Another aspect of leader behavior, close vs. general supervision, in relation to routineness of work has been explored among clerical and railroad workers. In a study of clerical workers and their supervisors in a life insurance company, Katz, Maccoby and Morse (1950) found that supervisors of high producing sections were significantly more likely to give general rather than close supervision ($p<.05$) and to be employee oriented rather than production oriented ($p<.05$). In a subsequent study of railroad workers (Katz, Maccoby, Gurin, and Floor, 1951), degree of closeness of supervision showed little difference between foremen of high and low producing sections. The difference in findings was partly explained by the fact that in clerical jobs the work methods were sufficiently routinized so that employees gained little direct technical assistance from close supervision, while in the railroad situation working procedures were less routine and workers could benefit in the way of technical support from direct, close contact with foremen.

These findings (and others which have been reported elsewhere) suggest that routine, standardized, programmed types of task situations are appropriately handled by directive supervision (Bass & Barrett, 1972). Moreover, routine tasks seem to be better handled by general (rather than close) supervision, at least in situations where direct, continuing technical support from supervisors is not needed.

Task complexity. The complexity of a task has also been seen to be an important variable. This term relates to Shaw's (1963) dimension of difficulty which he defined to include the number of operations, skills, and knowledges involved.

Bell (1967) considered complexity as one of three factors which affected span of control exercised by supervisors in a research study carried out in a hospital setting. The term as used by him involved four factors; degree of predictability of work demands, amount of discretion exercised, extent of responsibility, and number of different tasks performed. He found that the more complex the subordinate's task, the narrower was the supervisor's span of control ($r=.47$, $p<.01$); the more complex was the supervisor's job, the lower was his span of control ($r=-.38$, $p<.01$). Hence both the supervisor's and the subordinate's task complexity tended to decrease span of control. He also found closeness of supervision to be unrelated to span of control.

In another study involving a complex problem solving task, Becker & Baloff (1969) compared the relative effectiveness of three different forms of group structure (division of labor, hierarchy, and committee). Their results indicated that division of labor was significantly more efficient under a time constraint than either of the other two forms, and committee structure was more efficient than the hierarchical form. However, they noted that in situations where time is not the key criterion, the results might differ.

Wofford (1971) also reported some findings relevant to task complexity. His results suggested that a personal interaction manager is more effective for simple, as compared to complex, operations that are also centralized and structured. He also suggested that the manager oriented toward personal enhancement (characterizing those who use

authoritarian styles) is more suited to situations involving simple work schedules.

Alderfer (1969) also considered job complexity in an analysis of job enlargement in an industrial setting. He found that when job enlargement was introduced satisfaction with respect shown by superiors towards subordinates tended to decrease as a function of job complexity. People with enlarged, more complex jobs tended to have lower satisfaction with respect from superiors than persons holding similar jobs not enlarged.

While it is difficult to draw definite conclusions from these scattered findings, it seems legitimate to suggest that complex tasks would be best handled via participative and general supervisory styles where employees have freedom to exercise control over much of their own work, while more directive and close supervisory styles could be effectively utilized in simpler task situations.

Intellectual-mechanical. Intellectual (mental reasoning, problem solving) task activities have been differentiated from mechanical, manipulative types of activities in a number of studies. Carter, Haythorn, & Howell (1950) and Carter & Nixon (1949) found this type of distinction to be relevant in their research. However, the implications for the appropriate leader behavior are by no means conclusive.

In a study by Argyle, Gardner, and Cioffi (1958), supervisory styles of production foremen in eight British factories (involving manual types of activities) were studied. The results indicated that foremen in high producing sections were more democratic and less punitive than

foremen of low producing sections ($\chi^2=4.38$, $p<.05$) where an incentive system existed. For all departments, the combined dimensions of general, democratic and nonpunitive leader behavior yielded significant results in the predicted direction ($\chi^2=4.56$, $p<.05$).

Day and Hamblin (1964) in a laboratory experiment involving fairly complex mechanical tasks such as one might find on an assembly line, found that close supervision (versus general) produced a significant and large increase in aggressive feelings toward the supervisor ($p<.05$). Close supervision was not significantly related to dissatisfaction with task but did result in a significant and rather substantial decrease in production ($p<.05$). The punitive style also led to increases in aggressive feelings toward the supervisor ($p<.05$) but the relation to dissatisfaction with task was nonsignificant. However, as with the close supervision situation, punitive activities on the part of the supervisor led to a decrease in production.

In the previously mentioned studies of Katz et al. (1950, 1951) some interesting differences arise with regard to this task dimension. In the clerical worker study it was found that supervisors of high producing sections exercised general, nondetailed styles of leadership while in low producing sections, close, detailed supervision was used. However, the railroad study findings did not reliably differentiate high and low producing sections.

If we accept the Carter et al. finding that clerical tasks can be grouped with intellectual type tasks when considering leader abilities, then

the above two studies might suggest that general supervision is particularly relevant in nonmanual (intellectual) types of activities, especially those which are fairly standardized. Manual type jobs, however, may not suffer so much from close supervision--especially if the close supervision is mixed with a high degree of consideration. This point finds support in Fleishman and Harris' (1962) study of low-skilled blue collar workers. They looked at the consideration and initiation of structure dimensions of 57 supervisors in a motor truck manufacturing plant in relation to grievance and turnover rates and found that consideration was the dominant factor affecting these two criteria. That is, both grievance and turnover were highest in groups having foremen low in consideration regardless of structure. Thus if a supervisor was high in consideration, he could also be high in initiation of structure without greatly affecting grievance or turnover rates. These findings suggest that high structure and close supervision in mechanical tasks may not have negative effects <u>if</u> accompanied by high consideration. It is interesting to note that Day and Hamblin's findings concerning the relationship between close supervision and aggressive feelings seemed to be moderated by the self-esteem of the subordinate (i.e., an increase in aggressive feelings occurred only when the subjects had low self-esteem). High consideration by the supervisor might help to alleviate the self-esteem factor somewhat and thereby reduce the negative effects of close supervision.

Patchen (1962) also found a positive relationship between close supervision and higher performance in manual type work, especially when

there was strong group cohesiveness and where the supervisor was seen as a rewarding (as compared to a punitive) type. This study took place in a manufacturing plant where the subjects operated machines, but the work was manpaced, not machine paced. One important point raised by this study is the question of how one operationalizes a particular concept. As Patchen indicated, close supervision in his study meant frequentiy checking up on subordinates' work (which could involve giving advice and encouragement), whereas in other studies the term often implies a reduction in the amount of freedom and control one has over his job. These differences in the way terms are operationalized often make it difficult to compare the results of different studies.

What the above findings involving intellectual and/or mechanical types of work suggest is that close supervision, if mixed with high consideration, is suitable for mechanical-nonintellectual types of tasks. Intellectual-mental reasoning activities, on the other hand, suggest more general supervision (the R & D studies cited earlier also provide further support for this latter generalization).

Interdependency requirements. The interdependency requirement of task activities has also been isolated as an important task characteristic. For example, Shaw's (1963) study revealed "cooperation requirements" as one of six key dimensions in characterizing group tasks.

O'Brien (1969) in a theoretical discussion suggests that cooperation requirements should be matched with power structure. Thus, power equalization would seem to be appropriate for tasks which require high

cooperation, while a high power differential would be more permissible in situations where subordinates function independently.

Vroom and Mann (1960) reported results which essentially concur with O'Brien's views. Their study took place in a delivery company and involved two work units, drivers and positioners. The positioners' job situation involved small work units and considerable interaction among coworkers and between workers and their supervisors as well as a high degree of interdependence. The drivers' jobs involved little interpersonal interaction and considerable independence in work activity. The results revealed that the positioners (with high interpendency type jobs) had more positive attitudes towards equalitarian leadership while the drivers (independent work) preferred authoritarian leaders ($p<.05$ on 3 out of 5 relationships).

Equalitarian leadership may not apply to all phases of interdependent tasks. Doyle (1971) found that in group problem solving tasks, equalitarian leadership was most effective in the analysis phase of problem solving, while in the convergent, final synthesizing phase, where coordination becomes more important, groups with leaders having high status were particularly effective. Becker & Baloff (1969) also suggest that the optimum form of power structure in group activities may depend on whether the task involves information processing, generation of alternatives, or decision making. Hence, organizations might consider one form of structure for one phase of problem solving and another form for subsequent phases. An analysis of task must therefore bear in mind possible changes in demands of the task over time.

Finally, it should be noted again that the above key dimensions are by no means assumed to be the only dimensions worth considering. Moreover, overlapping of these characteristics also seems evident when we look at real world work situations. However, they do represent some of the more frequently cited task characteristics which have been identified in various studies over the last several years.

STRUCTURE

Structural variables consistently appear as central to discussions of organizational leadership, and a large body of research has focused on the relations between structural variables and organizational outcomes. In general, structure has been conceptualized in three ways corresponding to three levels of analysis: (1) task structure, (2) group structure, (3) organizational structure. Distinctions between these categories are not always clear; certain authors include characteristics of structure at several levels although they hypothesize relationships at only a single level. Moreover, with no generally accepted definition of structure, authors have explored different combinations of characteristics in their studies of structure.

Properties of organizational structure

Table 1 summarizes a number of studies that dealt with structural characteristics of organizations. It is apparent that there is general agreement on some characteristics and conflict over others. The specificity of the structure appears consistently in one form or another, for example Pugh et al's structuring of activity, Hage and Aiken's formalization,

Harvey's degree of program specification, Bass and Barrett's ease of measurement of progress, Woodward's organic-mechanistic distinction, or in Lawrence and Lorsch's measure of differentiation. Administrative intensity or the ratio of managers to total personnel appears frequently. The number and the nature of hierarchical levels is generally accepted as important, including in what level authority resides and how the span of control relates to level.

Size is a source of confusion. Porter and Lawler and Blankenship and Miles consider it to be a structural characteristic. Woodward, Pugh and Harvey define size as a contextual or environmental variable which interacts with structure.

Properties of group structure

Table 2 summarizes a number of studies that dealt with properties of group structure in organizations. Defining the characteristics of group structure is more difficult than organization structure since it interacts at one boundary with organization structure and at the other boundary with the task. For example, depending upon how the measure is made, span of control can be considered an organization or a group characteristic. The number of hierarchical levels is a characteristic of organization structure. The level of a group or the level-status differences within a group are characteristics of group structure. At the other boundary there is disagreement whether the nature of the task of the group is a measure of group structure. For example, Hage and Aiken (1969), look at how the routineness of the task interacts with structural characteristics; Becker and Baloff (1969) propose different group structures to deal with different task types. Yet, Pheysey, et al. (1971) use task complexity as a measure of group structure. Lawrence

and Lorsch, Heller and Yukl, and Bass and Barrett all include the function of the department as a characteristic of group structure.

Relationships

All of the works reviewed analyzed structure to see how it related to other variables. Some authors looked at simple relationships between structural characteristics and a variable. Others developed more complex schemes in which structural characteristics interacted with each other or with nonstructural variables which modify the effects upon the variable of interest.

At the level of the organization, Woodward (1965) found a direct relationship between technical complexity and characteristics of administrative structure. She found a U-shaped relationship between technical complexity and control structure, with the most and the least complex organizations tending to be organic in structure.

Hickson, et al. (1969) reoperationalized Woodward's (1965) measure of technical complexity into production continuity and workflow integration. They found U-shaped relationships between production continuity and several of Woodward's measures of administrative structure, and linear relationships between both measures of technical complexity and departmental function.

Harvey (1968) developed a measure of technical specificity (actually a measure of past changes in the technology). He found that as the amount of change decreased, his four structural characteristics increased. Mohr (1971) has argued that Harvey actually measured the relationship between structure and change.

Hage and Aiken (1969), using a scale of routiness, measured technology at the task level rather than the organizational level. They found that participation in organizational decisions, a measure centrality of structure, were negatively related to routiness. The existence of a rules manual and

the specificity of the job description, both measures of formalization of structure were positively related to routiness.

Bass and Barrett (1972) hypothesized a supervisor's tendency to be directive or participative in the presence of certain structural characteristics. They suggest a tendency towards a directive style if top management values directive style, if the time perspective is short, if progress is easily measured and objectives are clear, if the technical complexity of the organization (using Woodward's definition) is in the middle range, if job prescriptions are based on policies of work simplification, or if information distribution is limited.

Pheysey, et al. (1971) found that organization structure was consistently related to group structure. High role prescription was associated with high group formality at all levels and lower task complexity for lower levels. High centralization of authority was associated with low group autonomy and high external pressures.

At the level of the group, one structural characteristic to receive a great deal of study is span of control. Porter and Lawler (1965), Bass and Barrett (1972), and Heller and Yukl (1969) looked at it in relation to leadership style and job satisfaction. House and Miner (1969) reviewed both the span of control and the group dynamics literature and integrated the findings. They found that the effectiveness of different spans of control was related to the task demands, the desirability of group cohesiveness, the leadership skills available, and the diversity, stability, stress, and uncertainty in the environment.

Burgess (1968), after reviewing two decades of work on communication networks, shows that after an extended period, which allows the

subjects to learn to use the net, and with reinforcement to motivate group members, group performance is not related to the type of communication net. Mulder (1960) suggests that group performance is related to the decision structure. A defined communication structure will make it more or less difficult to develop the optimal decision structure. However, once it is reached, then the underlying communication net will not affect performance.

Becker & Baloff (1969) found that a division of labor structure was most effective for solving a specific problem-solving task. They further hypothesized that the most efficient structure would differ depending upon the task. A problem-solving task would require a different structure depending upon the mix of generating alternatives, processing information, and decision-making. A steady state task requiring no problem solving would require a different structure as well.

Mohr (1971) tried to test Woodward's (1965) findings using leader participativeness as a measure of structure and task manageability as a measure of technology. He found no significant relationship. Adding task interdependence and noise level of the environment improved the relationship somewhat.

Lawrence and Lorsch (1967) proposed that in a successful organization the group structure will fit with the environmental demands. They further proposed that, as differentiation between groups increases, the integration required to coordinate the organization will also have to increase.

The complex relationships reviewed are of great interest. Porter and Lawler (1965) found that size and level and size and shape interacted

to influence satisfaction and performance. In companies over 5000 people, managerial satisfaction was greater in tall organizations than in flat organizations. Moreover, productivity was better in large companies if they had a tall rather than a flat structure. Smaller subunits were associated with higher satisfaction among blue-collar level workers. At managerial levels, subunit size showed no relationship.

Blankenship & Miles (1968) found that level within the hierarchy had the greatest relationship to decision behavior of managers. However, size of organization could reverse the relationship with lower level managers in small organizations behaving like upper level managers in large organizations.

Pugh et al. (1969) developed a multiple prediction model relating the four structural dimensions identified by Pugh et al. (1968) to various contextual variables. Structuring of activities was positively related to organization size, workflow integration, and size of the parent organization. Concentration of authority was positively related to dependence and dispersion and negatively related to age of the organization, diversity of operation, workflow integration, and size of the parent organization. Line control of the workflow was negatively related to variability of the operation and workflow integration. It was positively related to the number of operating sites. Size of the supportive component showed no significant relationship.

Pheysey, et al., (1971) who found the direct relationship between organization structure and group structure, also found that the relationship between both structures and group performance was confused by the intervention of organization and group climate. Structure was found to be unrelated to climate.

There are two conceptual difficulties which hinder the analysis of structure. The first problem is differentiating between levels of analysis. Several studies such as Mohr (1971) and Hage and Aiken (1969), hypothesized a relationship at the level of the organization but used one or more measures at the level of the group or the individual. It is difficult to compare across findings or to generalize from there results to a simple relationship between structure and some contextual variable. A complex model of the effects of structure must include the relationship between the three levels of structure as well as the differing effect of these variables.

A second conceptual problem is the distinction between structure and climate. A study of the literature shows the two terms are often used interchangeably or that measures of one are included in scales of the other. Pheysey, et al.(1971) attempted to define the relationship between structure and climate at the organizational and group level. Their hypothesis of a direct relationship between structure and climate was not supported. Their results indicate that climate at, for example, the level of the organization, can mediate the effect of structure on climate at the level of the group. These results indicate that a model of the effects of structure must consider the effects and interactions of climate at each level of analysis.

Two research efforts have developed complex models which deal with some of the problems. Pugh, et al. (1968, 1969) developed a complex predictor model which carefully defines the differential effect of structural and contextual variables at a single level, that of the organization. Yukl's (1971) multiple linkage model provides a framework to study the effect of organization and task structure, as well as other variables on the performance

of a group. Both complex models promise to provide a better understanding, a closer mirroring of what is actually happening than simple or linear models.

EXTERNAL ENVIRONMENT

The impact of the external environment on organizations' internal functioning has been virtually ignored by behavioral scientists as a researchable area until very recently (Lawrence & Lorsch, 1967). This is true despite the fact that managers have long known that they must be sensitive to various areas of the external environment to insure their organizations' survival. In fact, it is not difficult to find entire volumes devoted to data-free discussions of businesses and their environments (e.g., Moranian, Grunewald, & Reidenback, 1965; Walton, 1966). Such volumes are typically devoted to aspects of the economic, political, social, legal, and geographical environment. In contrast, organizational theorists in the behavioral sciences are more concerned with the internal structure and functions of the organization. When they speak of the environment they are usually referring to the communication patterns, degree of structure, decision-making processes, etc. that occur within the organization. The organization was thus treated as a closed system.

Theory

Several theoretical efforts have been proposed recently that recognize the importance of including aspects of external environment in a comprehensive model of organizational behavior. The important foundations for theoretical development are found in Bertalfany's (1956) formulation of open-system theory and its elaboration by Miller (1955, 1971). Specific application of open-system theory to the study of social structures was done by Parsons (1951) and recently extended by Katz & Kahn (1966).

The major distinction between closed-system and open-system theory is found in the entropy assumption of the latter; unless a system, i.e. organization, receives input from its supporting environment, the organization would inevitably run down to a state of chaos and thus cease to exist as an organization (Katz & Kahn, 1966). Thus the close relationship between organization and environment is emphasized.

The initial formulation of open-system theory drew attention to the notion that organizations must interact with their environments by virtue of an exchange process that occurs in a repeated input-throughput-output cycle. The input provides energy, e.g. labor, raw materials; energic input is transformed into output that is then exchanged in the environment for more energic input to keep the cycle going. The entropy principle requires that the organization exchange its output for more energy than was required in the transformation of the input to output.

Emery and Trist (1965) developed the notion that, in addition to interactions between internal components of organizations and between organization and environment components, interactions between components within the environment should also be considered. This they termed the "causal texture" of the environment. Four ideal types of environment were conceptualized, each type exhibiting a different degree of "system connectedness" among its components. Three of the types, placid-randomized, placid-clustered, and disturbed-reactive were previously recognized and described in other areas e.g., biology, economics. The fourth type, turbulent field, is described by Emergy and Trist as follows:

> Yet more complex are the environments we have called turbulent fields. In these dynamic processes which create significant variances for the component organizations, arise from the field itself. ...they are dynamic. ...the dynamic properties arise not simply from the interaction of the component organizations, but also from the field itself. The ground is in motion.

The effect of the turbulent field environment is that for organizations their area of relative uncertainty is increased and the consequences of their actions become increasingly unpredictable. Thus turbulence arises from complexity and rapid change in the causal interconnections within the environment.

Emery and Trist illustrate by a case history the transition of the environment from disturbed reactive to turbulent field and its impact on a vegetable canning firm. The firm had maintained a 65% market share for many years prior to World War II. Following the war it automated in a fashion consistent with their previous market, product, and technology. Postwar changes in the prices of raw materials and vegetables, diversity in new products, quick-freeze technology, the emergence of supermarkets, and increased buyer affluence combined to cause a large and sharp decrease in the firm's market. Thus a large number of changes in the external environment interacted very rapidly to produce an irreversible change in the market for the firm's product and resulted in a prolonged period of reorganization and redefinition resulting in a new product mix and new identity for the firm.

Terreberry (1968) in a theoretical discussion elaborated on the four ideal environments proposed by Emergy and Trist and proposed two hypotheses: (1) that organizational change is increasingly externally induced; and (2) that organizational adaptability is a function of ability

to learn and to perform according to changes in the environment.

With regard to hypothesis one, Terreberry notes that there is no systematic empirical evidence on the relative influence of internal versus environmental antecedents to organizational change. The difficulties of objective specification and measurement with presently available techniques mitigate against rigorous examination of hypothesis one.

Hypothesis two is conceived as requiring specification of an organization's perceptual and information-processing capacities. Crucial variables are advance information of impending environmental change, active search for advantageous input-output transactions, and available memory store of interchangeable input and output components in the environment.

Empirical Research

As noted above, sound research data bearing on environmental-organizational issues are sparse. Even more sparse are studies describing environmental effects on leader behavior within organizations. There are a few studies however that provide a basis for generating hypotheses about such effects and these will be described below.

Lawrence and Lorsch (1967) adopted the open-system concept of organizations as their guiding framework. They therefore recognized not only within organizations interdependencies among components, but also transactional interdependencies between organization components and environmental components. As a mechanism by which organizations adapted to their external environment, they postulated structural changes, i.e. integration and differentiation of subunits. Differentiation allows separate subunits to deal with task relevant parts of the environment while integration provides for the collaboration of subunits to deal

effectively with the environment.

Lawrence and Lorsch recognized that these are not new concepts to organizational theorists, but the manner in which the concepts were used to shed light on differences in goal orientation, time orientation, interpersonal orientation, and on the cognitive and emotional orientation of managers in different functional departments was different from the classical use of these concepts.

Their research strategy involved ten organizations, six in the plastics industry, two in the food industry, and two in the container industry. In each organization questionnaires and interviews were used to gather data on environmental demands, integration and differentiation of subunits, departmental attributes on numerous dimensions, organizational performance, and conflict resolution. Within each industry high and low performing organizations were identified and compared to determine how their internal characteristics were related to their environment.

An important aspect of the findings was concerned with the differential behavior of managers in the firms studied. Effective organizations in a rapidly changing, complex environment involved lower level managers in joint departmental decisions. Managers who possessed the competence and knowledge to deal with the environment had more decision making influences than those who did not. Effective organizations in relatively stable environments concentrated decision making and influence at top level management.

Interview data suggested that sources of job satisfaction were also different for organizations in different environments. Those managers in rapidly changing environments derived satisfaction from participative

decision making found in effective organizations. Managers in stable environments found satisfaction from being able to get a quick decision from higher levels.

Burns and Stalker (1961) interviewed key people in 20 organizations in a variety of industries. They classified the management methods as either "mechanistic" or "organic." The mechanistic style was found more appropriate for dealing with stable environments while the organic style was more suited to changing environments. The mechanistic organization was characterized by vertical communication patterns with decision and influence centered at the top levels while organic firms featured lateral communication and less rigidly defined jobs.

Hall and Mansfield (1972) studied the effect of environmental stress on researchers in three research and development organizations using a two-year longitudinal design. Before-after questionnaire and interview data were collected from researchers and additionally from separate independent samples of researchers at both points in time providing for control groups.

The environmental stress was caused by a sudden drop in available research funds resulting in strong internal pressures for reduced spending and search behavior for new sources of funds.

The resulting organizational change was to revise structure by increasing higher management control. Response to the external stress was determined completely by top management with little or no consultation or communication to the level of the researchers. Company policy was revised to reflect increased need for profits and to conserve resources.

The effect on the researchers themselves was mainly in decreased

identification with the organization, decreased need satisfaction, and less favorable job opportunities. Performance, effort, aspiration levels, and intrinsic motivation showed no appreciable change. These findings indicated that an environmentally induced organizational change was reflected, not in an individual's approach to the job itself, but in his psychological withdrawal from the organization.

Dill (1958) examined the effect of the task environment on managerial autonomy using observation and interview methods in two Norwegian firms, a clothing firm and a sales, engineering firm. The task environment was defined as customers, suppliers, competitors and regulatory groups and managerial autonomy was the degree of freedom from influence perceived by an executive.

The executives in one company (sales, engineering) were required to deal with a heterogeneous,changing environment while in the other company the environment was constant, executives were required to deal with the same customers, suppliers and regulatory bodies repeatedly. The demand for direct interaction with the environment was greater for the sales, engineering company while in the clothing company interaction was accomplished indirectly, mainly in written form. The stability of the environment in the short run was higher for the sales, engineering company so that feedback from the environment had less of an impact on it than on the clothing company.

The autonomy of executives was less in the environment where differention of customers, etc. was less, feedback was greater, stability was low in the short run, and communication with the environment was indirect. All these characteristics were associated with the clothing

company. Executives were less involved in decision making and more concerned with routine tasks. Their autonomy was more restricted both horizontally and vertically compared to the sales, engineering executives where environmental properties were opposite to those of the clothing firm.

While the amount of data is admittedly sparse they are also quite consistent. Managerial behavior was clearly associated with events in the external environment of the organization as operationalized in the studies reviewed.

It is seen that changes in organization structure occurred whose effect was to increase the latitude of responsibility for some managers with a concomitant change in managers' sources of job satisfaction. Management style and communication patterns were also found to vary with environmental characteristics. Additionally, at the individual level decreases were observed in the important variables of identification with the organization and job satisfaction.

Perhaps the most important point to note in the four studies is that "successful" organizations changed in some way when the environment changed, while "unsuccessful" organizations did not. These findings are consistent with Terreberry's (1968) second hypothesis which considers advance information of impending environmental change as a crucial variable.

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Table 1

Properties of Organization Structure
Examined in Recent Studies and Literature Reviews

Study	Structural variables
Porter & Lawler (1965)	Organization size Shape (tall, flat) Centralization-decentralization
Woodward (1965)	Span of control Ratio of managers to total personnel Ratio of direct to indirect labor Length of line of command chain
Pugh, Hickson, Hining & Turner (1968)	Structuring of activities Concentration of authority in upper levels Line control of work flow Relative size of supportive component
Harvey (1968)	Number of functional subunits Number of levels of authority Ratio of supervisors to total personnel Degree of program specification
Blankenship & Miles (1968)	Organization size Span of control Managerial level
Haig & Aiken (1969)	Degree of centralization Degree of formalization Stratification Complexity
Wofford (1971)	Degree of centralizaiton Work group structure Organizational layering and communication
Lawrence & Lorsch (1967)	Differentiation formalization of unit structure interpersonal orientation of unit time orientation of unit goal orientation of unit integration

Table 2

Properties of Group Structure Examined
in Recent Studies and Literature Reviews

Study	Structural variables
Bass & Barrett (1972)	Information dispersion Span of control Status and legitimacy of positions Functional assignment Man-to-man vs. overlapping groups Interaction potential within group
Physey, Payne, & Pugh (1971)	Formality Autonomy Degree of external pressure
Wofford (1971)	Size of group Dependency of employees Situational support for group meetings
Mohr (1971)	Participativeness of supervisor
Becker & Baloff (1969)	Three types of group structure: hierarchical committee division of labor
Heller & Yukl (1969)	Departmental function Span of control Level
Blankenship & Miles (1968)	Span of control
Porter & Lawler (1965)	Level of group Line or staff function Span of control Subunit size
Mulder (1960)	Interaction structure defined by communication net Decision structure to deal with task

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