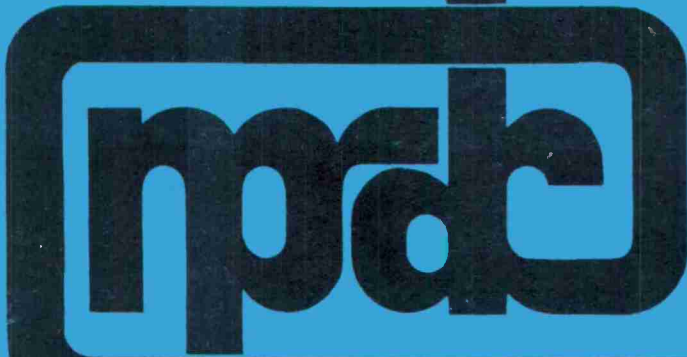


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**THE MEASUREMENT OF ORGANIZATIONAL EFFECTIVENESS:
A REVIEW OF RELEVANT RESEARCH AND OPINION**

**John P. Campbell
David A. Bownas
Norman G. Peterson
Marvin D. Dunnette**

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The general topic of defining organization effectiveness is addressed. While no succinct definition is provided, a construct of organizational effectiveness is recognized. Existing theory, research, and practice surrounding the con- struct has been searched and current measurement techniques have been cataloged along with summaries of various theories and models. Alternative methodologi- cal approaches and manifest characteristics of organizations in terms of effec- tiveness are considered. A compilation of independent, dependent, and inter- vening variables is presented. Suggestions are offered for future research in			

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20. the Navy setting in the area of organizational effectiveness.

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FOREWORD

This research was performed in support of exploratory development task area, PF55.521.018, "Organizational Effectiveness". The problem and its relevance to the Navy were drawn from Cosentino, S. and DiGialleonardo, F., "Development of a Naval Organizational Behavior Research Program (Interim Report)", A staff study: Work Unit No. PF39.521.018.02.01, Washington, D. C.: Naval Personnel Research and Development Laboratory, January 1972.

The source of this contract was an unsolicited proposal submitted by Personnel Decisions, Inc. 26 July 1972 to the Naval Personnel Research and Development Laboratory, Washington, D. C. The contract was awarded 22 Nov. 1972 and completed 8 April 1974. The specific problem addressed is the formulation of research recommendations for the Navy in the area of organizational effectiveness. The contract was initially monitored by Mr. H. Ozkaptan who served until disestablishment of the Naval Personnel Research and Development Laboratory at which time monitorship was assigned to Mr. S. E. Bowser of this Center who served until the contract was completed.

J. J. Clarkin
Commanding Officer

Problem

The specific problem is a lack of clear understanding of the definition and conceptualization of the term 'organizational effectiveness' and the potential significance and benefit of any research undertaken to improve organizational effectiveness within the Navy. The immediate task to which the present report responds is the collection and distillation of related literature and the formulation of research recommendations for the Navy in the area of organizational effectiveness.

Research Objective

It was the stated purpose of this effort to specify designs for an additive series of research studies to comprise a comprehensive program of fundamental research, data acquisition, and information storage for use in learning about the causal effects of organizational intervention and change technology. Given a systematic integration of all research literature in the area of organizational effectiveness, the articulation of principal dimensions of effectiveness and identification of important variables follows. The content of this report is derived largely from a search of existing theory, research, and practice surrounding the constructs of organizational effectiveness.

Approach

The literature of organizational effectiveness was reviewed and used as a basis for the report. To search this literature the primary sources were followed back approximately fifteen to twenty years. Beyond that, reliance was placed upon secondary sources such as books on organizational theory and management, administrative and management science, industrial relations, organization theory, and operations research which were searched as thoroughly as possible. The practitioner or general public oriented literature such as Fortune, Business Week, etc., was also surveyed. No constraints were initially placed upon the type of literature to be searched. This resulted in a great deal of reading that proved unproductive but established confidence that nothing of a significant nature had been missed. Available computerized abstracting services were also utilized.

Results

The review of organizational effectiveness is expressed in the following ways. A catalogue was compiled of existing ways in which effectiveness has been measured, noting strengths, weaknesses and gaps in this composite picture. While no succinct definition is provided, a construct of organizational effectiveness is recognized. Existing theory, research, and practice surrounding the construct has been searched and current measurement techniques have been catalogued along with summaries of various theories and models. Alternative methodological approaches have been reviewed. Consideration has been given to ways in which organizational theorists and researchers have defined the construct. A summary and compilation of variables, independent, dependent, and intervening

has been made. The final aspect of the report suggests a program of research that might reasonably be pursued by the Navy during the next eight to ten years to advance the understanding of organizational effectiveness.

Recommendations

It is recommended that future research focus on the following areas:

(1) The analysis and development of Criteria of organizational functioning whether they be systems or goal oriented. (234-236)

(2) Naturalistic observation studies involving both in vivo and retrospective studies of Naval Organizational units. (236-243)

(3) The psychometric evaluation of both existing measures and measures which may be derivable in the future in the area of organizational effectiveness. (243-256)

(4) The outlining of systematic research studies on the independent "levers" that may or may not effect organizational functioning. (256-264)

Additional positive recommendations are in the nature of general support to any studies which may have relevance for understanding more fully the functioning of Naval units and systems.

The remaining recommendations are in the form of what should not be done. The literature survey has suggested certain research and theory directions which should not be followed. For example, empirical multivariate research based on a factor analytical approach to criterion development should be avoided. It is recommended that careful consideration be given to previous research before undertaking new research efforts.

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I. INTRODUCTION

This monograph is concerned with the general question of what is organizational effectiveness. By its very nature such a question is incapable of being answered. There is no one thing that can be identified as organizational effectiveness and to seek such an illusory variable would be to incur a great deal of frustration and wasted effort. However, we do feel that there is a set of more specific and proximate questions concerning a construct called organizational effectiveness that can profitably be pursued, and a number of these are considered throughout this report.

Aims and Objectives

The content of this report is derived largely from a search of existing theory, research, and practice surrounding the construct of organizational effectiveness. Using the literature on effectiveness as our basic data, our general objectives were as follows:

1. To compile a catalogue of the existing ways in which effectiveness has been measured and to note the strengths, weaknesses, and gaps in this composite picture.
2. To summarize various theories or models of organizational effectiveness that attempt to specify the nature and meaning of effectiveness as a construct.
3. To review alternative methodological approaches that have been used to determine empirically the functional relationship among various specific measures of effectiveness.
4. To consider ways in which organization theorists and researchers have attempted to relate the manifest characteristics of organizations to their effectiveness. Organization structure is one example of a set of such characteristics.
5. To compile a catalogue of independent variables, vis-a-vis effectiveness as a dependent variable, and to summarize briefly the yield of research data relative to how these independent variables influence various aspects of organizational effectiveness.
6. To suggest a program of research that might reasonably be pursued by the Navy during the next eight to ten years to advance our understanding of organizational effectiveness and how it might be best changed by more than a random amount.

The above objectives constitute a much broader task than was originally envisioned for the project and the length of the report expanded proportionately. However, the expansion seemed necessary if any kind of order was to be distilled from all the bits and pieces.

2.

Search Procedure

To search this literature we followed the primary sources back approximately fifteen to twenty years. Beyond that we relied on secondary sources such as books on organization theory and management or established literature reviews. Literature in the fields of sociology, psychology, political science, management, administrative and management science, industrial relations, organization theory, and operations research was searched as thoroughly as we could. We also surveyed the more practitioner or general public oriented literature such as Fortune, Business Week, and the like. Initially, we tried to avoid almost all constraints on the type of literature to be searched. This resulted in a great deal of reading that proved to be of no assistance but heightened confidence that we had not missed any major contributions or failed to see any major "themes" underlying the literature.

The computerized abstracting services from Psychological Abstracts, NTIS, and DDC were also employed using a wide variety of key words (e.g., organization theory, effectiveness, performance, organization analysis).

The Literature: Descriptive Characteristics

To further aid in setting the context, it might be profitable to describe briefly some of the parameters and trends that seem to characterize the organizational effectiveness literature.

1. First of all, most of it is discursive or theoretical in nature and not empirical. In a sense this is a recognition of the difficulty in doing systematic research in a domain where an entire organization is counted as just one degree of freedom. We shall come back to this notion many times, namely that a concern for the study of organizational effectiveness implies that an organization is to be taken as a degree of freedom rather than the individual and the sheer availability of "subjects" becomes a problem. As a result most of the empirical work consisting of case study type investigations and projects using many degrees of freedom quite often become classics in their own time.
2. Before the mid 1950's most of the systematic study of organizational effectiveness was carried on by sociologists, and the primary mode of research was the case study.

Philip O. Selznick's classic study of the TVA is an example (Selznick, 1966¹). William Foote Whyte's (1948) examination of the restaurant industry is another. Blau (1955) and Gouldner (1954) were other major contributors.

3. March and Simon's (1958) classic analysis of organizations in terms of decision making and choice behavior ushered in the era of psychology and management science and the number of individual research projects increased as did the breadth and scope of theorizing about organizational effectiveness. Also, before the mid 1950's specific concerns for organizational effectiveness were blended in with the general literature on organization theory. That is, effectiveness tended to take a back seat to questions of what an organization actually is, how many different kinds there are, how they develop, etc. A seminal point of departure was the 1957 Georgopoulos and Tannenbaum criterion study which set apart the measurement of effectiveness as a distinct topic. Theory and research concerning organizational effectiveness exhibited its greatest growth during the 1960's. If this domain has had a golden era, the 1960's are it. Very recently it has seemed to slow and even undergo a leveling out. At the same time, the nature of the empirical research has seemed to shift from exploratory or "one shot" type studies to more programmatic efforts that are guided by some sort of theory. Two prime examples of the latter are the research conducted by Likert, Seashore, and Bowers at the University of Michigan's Institute for Social Research (Bowers & Seashore, 1966; Likert, 1967; Taylor & Bowers, 1972) and the series of studies produced by the English group at the University of Aston (Pugh, Hickson, Hinings, & Turner, 1968, 1969).
4. While research on organizational effectiveness seemed to be settling down to more interrelated studies based on some sort of conceptual framework, a parallel development has been the rapid rise in behavioral science based organization development. In general, the field of OD is not research based but is practitioner oriented and directly concerned with making changes in organizational effectiveness using a variety of techniques; and although they often protest to the contrary, OD specialists do make fairly strong assumptions about what an effective organization should be like. These are discussed a bit later. In contrast to the research enterprise, which

¹Originally published by the University of California Press, Berkeley and Los Angeles, 1949.

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seems to be coalescing around a relatively small number of conceptual models, the OD practitioner field has developed a bewildering variety of conceptual and operative models (Burke, 1973; French & Bell, 1973; Hornstein, Bunker, Burke, Gines, & Lewicki, 1971).

5. The acronym OD is used primarily to designate organizational change efforts that are associated in some degree with the attitudes and practices of sensitivity training. The total range of techniques for changing organizations that have a behavioral science flavor is, of course, much broader than that. In recent times new developments in management information systems, operations research, and accounting practices such as human resources accounting have taken on the character of "intervention techniques." The psychologist must now share the spectrum with the computer technologist, systems engineer, and accountant.
6. One final observation about the literature in this area is that there is a perceptible undercurrent of despair that has manifested itself among the research types in recent years. By contrast, many of the OD practitioners seem to be in a state of euphoria. Organizational effectiveness is admittedly a complex topic, and depending on your inner strength, it may look far too complicated to ever be resolved in any systematic way. The research questions of what is organizational effectiveness and how is it determined may yet go the way of the timber wolf (an endangered species), or worse yet, the armadillo (an extinct species).

II. ORGANIZATIONAL EFFECTIVENESS AS A CONSTRUCT

As will be seen in the following section, there is perhaps even less reason for entertaining any notion of the criterion (Dunnette, 1963) with regard to organizational performance than with regard to individual performance. As contrasted to individual performance organizational effectiveness criteria can undoubtedly be dimensionalized (i.e., "factored") with regard to an even greater number of facets and the number of situations in which someone would want to combine multiple criterion measures into an overall measure (e.g., Schmidt & Kaplan, 1971) seems much less than for criteria of individual performance.

Perhaps a better way to think of organizational effectiveness is as an underlying construct which has no direct operational definition, but which constitutes a model or theory of what organizational effectiveness is. Certainly this is not unlike the way industrial and organizational psychologists have come to conceptualize individual effectiveness (Campbell, Dunnette, Lawler, & Weick, 1970). The functions of such a model would be to identify the kinds of variables we should be measuring and to specify how these variables, or components, of effectiveness are interrelated--or should be interrelated. Hopefully a fully developed construct or model would also tell us to what uses measures of the individual components of effectiveness could be put.

Strictly speaking it is not possible for anyone concerned with the effectiveness of organizations to avoid using it as a construct or to avoid operating via some kind of theory. Without a theory of some sort, even if it has never been made public, it is not possible to say that one organization is more effective than another, or to say that variable X is a measure of organizational effectiveness and variable Y is not, or to plan ways to "change" an organization. Thus, it is incumbent on all those concerned to make their "theories of effectiveness" as explicit as possible.

At this point we would like to examine the major conceptual themes that seem to account for the variety of ways the construct of organizational effectiveness is used in the literature.

Two General Models of the Effectiveness Construct

Based on looking at all this literature, observing an occasional administrator, manager, or military officer, and listening to people talk about organizations, we submit that there appear to be two general points of view, with variations, as to how one should assess organizational

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effectiveness. They have been given various labels but the most popular are the goal centered view and the natural systems view (e.g., see Ghorpade, 1971). The term "system" is used here in a somewhat different way than it is by industrial or systems engineers or by those who deal with systems theory in a very formal or mathematical sense (e.g., Berrien, 1968).

The goal centered view makes a reasonably explicit assumption that the organization is in the hands of a rational set of decision makers who have a set of goals in mind which they wish to pursue. Further, these goals are few enough in number to be manageable and can be defined well enough to be understood. Given that goals can be thus identified it should be possible to plan the best management strategies for attaining them. Within this orientation the way to assess organizational effectiveness would be to develop criterion measures to assess how well the goals are being achieved. There are a number of variations of the goal centered view. The management by objectives tradition (e.g., Odiorne, 1965, 1969) as it is usually practiced tends to fall in this category. The recently renewed movement toward cost/benefit analysis (Rivlin, 1971) is an ambitious attempt to assess the actual utility of accomplishing specific goals. During the 1960's the attempt to derive overall measures of military readiness (Hayward, 1968; Popper & Miller, 1965) is yet another variation. These and other examples of this model are discussed below.

The natural systems view appears to make the assumption that if an organization is of any size at all the demands placed upon it are so dynamic and so complex that it is not possible to define a small number of organizational goals in any way that is meaningful. Rather, the organization adopts the overall goal of maintaining its viability or existence through time without depleting its environment or otherwise fouling its nest. Thus to assess an organization's effectiveness one should try to find out if an organization is internally consistent within itself, whether its resources are being judiciously distributed over a wide variety of coping mechanisms, whether it's using up its resources faster than it should, and so forth. One implicit assumption that the people with this orientation seem not to always own up to is that to be effective the organization needs some theory or model that specifies the kinds of coping mechanism that must be built and kept lubricated. It cannot prepare itself for literally everything. One clear example of such a natural systems model that incorporates specific a priori notions of what system variables should be assessed is the one developed at the University of Michigan Institute for Social Research by Likert and his associates (Likert, 1961, 1967). In the beginning the basic systemic variable was the degree to which subordinates participated in making the decisions which affected them, or to say it another

way, the degree to which supervisors shared their influence. By implication, an organization in which decisions were made participatively was a healthy and capable organization. The list has since been expanded to include communication factors, motivational practices, and the like. The focus is on "people" factors and not on the state of the organization's technology or its physical structure. The current state of the organization is measured via a questionnaire. The most recent formalization of the model and the current measurement instrument is described by Taylor and Bowers (1972) and by Franklin (1973). Other examples of systems models are those outlined by Argyris (1964), Blake and Mouton (1968) and Katz and Kahn (1966). These and others will also be discussed in more detail below.

One principal point to be made here is that if an organizational consultant were to be parachuted to the deck of a ship and asked to assess the effectiveness of that organization, how he would begin the assessment would depend in part on which of these two points of view he had internalized. The goal oriented analyst would immediately seek out the principal power centers or decision makers on board and ask them to state their objectives. If he were worldly wise he would also employ techniques to reveal the actual operative goals of the organization as well as the publically stated ones. For example, the captain's formally stated goal might be to have his ship score high on a specific set of maneuvers. However, his operative goal might be to "look good enough to earn a promotion." The formally stated goals and the operative goals may not be precisely the same. For better or worse, once the consultant had the goals defined he would proceed to develop criterion variables that would measure how well the objectives (of either kind) were being met. The "validity" of a particular criterion for assessing the degree of attainment of a particular goal would be a matter of expert judgment. We should keep in mind that goals are not criteria. One is a desired end state and the other is an operationalized continuum representing the degree to which the desired end state is being met.

If a natural systems oriented analyst were to fall from the sky he would not first ask what the organization was trying to accomplish. Rather he would nose around the ship a lot and ask questions, perhaps about the degree of conflict among work groups, the nature of communications, the level of racial tension, the percentage of billets that were filled by people with the appropriate level of training, what the commanding officer was trading away to get the personnel he wanted, the morale of the officers and crew, and the like. At the outset he would not be concerned with the specific tasks the ship was trying to perform but would be concerned with the overall viability and strength of the system. He would have some a priori notions of what the characteristics of a strong system are and he would center his questioning around those. For example,

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if he were from the Institute for Social Research he would most likely administer the Survey of Organizations questionnaire (Taylor & Bowers, 1972). Supposedly, if the ship turned out to be a strong and well balanced system, it should be equipped to pursue a wide variety of objectives and meet a wide variety of demands.

If both these analysts take their logical next steps their efforts will tend to parallel each other, if not actually converge. If the goal oriented analyst attempts to diagnose why an organization scores the way it does on the criteria he will soon be led back to system type variables. For example, perhaps the ship did not perform well in maneuvers because of racial tension on board. If the natural systems analyst wonders how various systems characteristics affect task performance, he very soon will be trying to decide which tasks are the important ones on which to assess performance. Unfortunately, in real life these second steps are often not taken. The goal oriented analyst tends not to look in the black box and the natural systems oriented analyst does not like to worry about actual task performance unless he's pressed.

We should note in passing that the above dichotomy appears not infrequently in other forms and other places. It is very similar to the general notion of process vs. outcome research. Research on the employment interview is an example. For years the emphasis was on the interviewer's final judgment and its reliability or validity. Only recently have investigators looked at the process involved in the way the final decision is actually made. The process type studies have tended to show that interviewers have well defined stereotypes of a good applicant that may or may not match the requirements of the job, that negative information is given an inordinate amount of weight, and that the actual decision is made much earlier in the interview than anybody previously realized. There is a strong assumption underlying this research that if interviewers are trained to know their own processes and "improve" them the resulting employment decisions will be "better."

III. SPECIFIC EXAMPLES OF GOAL AND SYSTEM MODELS OF ORGANIZATIONAL EFFECTIVENESS

What we would like to do in this section is discuss briefly each of several examples of both the goal and systems view of the effectiveness construct. The intent is to sample all the major varieties of each kind. That is, we hope we haven't missed any. Some of them are taken out of their original context (e.g., management by objectives); nevertheless, we think they all have value in showing how the specific model of effectiveness one adopts can significantly influence the way in which organizational effectiveness is ultimately measured (either by design or by default).

The Industrial/Organizational Psychology "Criterion" Model

In the context of measuring individual performance, the "criterion problem" has a large and honorable niche in the literature of industrial and organizational psychology (e.g., Blum & Naylor, 1968, Ch. 6; Campbell, Dunnette, Lawler, & Weick, 1970; Dunnette, 1966; Schmidt & Kaplan, 1971; Wallace, 1965). At the base of the criterion issue, defined as this literature defines it, is the axiom that a criterion is a measure of the degree to which an individual is contributing to the goals of the organization. Thus, if we were to transport this formulation of effectiveness from the domain of individual effectiveness to that of organizational effectiveness it would be securely within the goal centered view of the construct.

It would be fruitful at this point simply to list the major ingredients of the criterion model with an eye toward their implication for how organizational effectiveness should be assessed. We realize that this is a distillation of many contributions of many people and also that many readers of this report are themselves deeply emersed in the criterion problem and have definite views on the matter. Thus the following list may not seem complete enough to all readers. We apologize at the outset for such oversights.

In our view, the "criterion problem model" seems to incorporate the following features.

1. Overall effectiveness is not one thing but is made up of component criteria. The criterion was laid to rest some time ago.
2. The specification of the individual component criteria flows from a detailed and systematic job description. That is, the

first step in criteria development is to describe concretely the major tasks the individual is to perform. By implication, the tasks to be described are directed at obtaining a specific set of subgoals that contribute to the organization's overall goals.

3. The empirical relationships among the component criteria should be determined. That is, a fairly large number of individuals should be assessed on each criterion component and multivariate analysis techniques (e.g., factor or cluster analysis) should be used to examine the pattern of relationships among the components. Empirical data should also be used to determine how the pattern changes over time as a function of changes in the individual job holders or of changes in the job or organizational content. Empirical analyses should be performed to find out if changes in individual component scores and/or their patterning represents changes in the true scores (reliability) or changes in error scores (unreliability).
4. The way in which individual criterion component scores are combined or otherwise used to make specific decisions (e.g., promotions) is determined by expert judgment.
5. Criterion measures should be a reflection of what the individual actually does. That is, they should represent an assessment of accomplishments that are directly under the individual's control. Variability in criterion scores across individuals or across time should be due to what the individual does, not extraneous influences. For example, criteria for salesman effectiveness which are more a reflection of geographic location than the skill of the salesman are not good criteria.
6. The criterion measures should be reasonably feasible, in terms of the effort and financial costs involved in collecting data on them.

If this model were applied to a consideration of organizational effectiveness, the following features would be suggested. First, we need an organizational job analysis to tell us what the major tasks of the organization are. To accomplish this we might consider the feasibility of using techniques of job analysis such as those described by Blum and Naylor (1968) or Dunnette (1966). The critical incident technique is one example. After some potential criterion measures are developed we must try them out on a large number of organizations so as to examine

the psychometric properties of the components. Finally, we need to assure ourselves that the component measures are indeed assessing variables over which the organization has some control. The method of scaled expectations (e.g., Campbell, Dunnette, Arvey, & Hellervik, 1973; Folgi, Hulin, & Blood, 1971; Smith & Kendall, 1964) is one possible technique that can be used.

In sum, the criterion problem model assumes that qualified experts can use one or more of several techniques to infer criterion measures from a description of tasks to be performed. It demands a multivariate analysis of data collected on a large number of observations.

Cost/Benefit Analysis

Although its history as a formalized procedure is rather short, cost/benefit analysis had traditionally been applied to the evaluation of the relative effectiveness of alternative training programs, alternative methods for developing products, and the like. That is, it is most often used to measure the relative effectiveness of alternative courses of action toward some goal, not the effectiveness of the entire organization. Nevertheless, it is firmly rooted in the goal oriented model (e.g., see Rivlin, 1971) and conceivably could be used to determine whether an organization was pursuing its goals with methods that were "cost effective." This implies that there are actual alternatives to compare, or that expert judgment could be used to develop an "achievement standard" against which the cost/benefit ratio of an existing course of action could be compared.

Inherent in the cost/benefit model are the notions that the components of both the numerator and the denominator can be reduced to a single composite score and that ratio has at least interval scale properties. Since the formal use of cost/benefit analysis to evaluate alternative organizational strategies really got its biggest push in the Department of Defense (e.g., see Hitch, 1965) in the form of the Planning-Programming-Budgeting System (PPBS) we do not feel the need to tell the Navy what it already knows and review the history of PPBS in the DOD. However, the use of PPBS methodology and the cost/benefit model spread to the evaluation of social programs as well as to a wide variety of other programs and these attempts at further application served to highlight more fully the strengths and weaknesses of the model (Rivlin, 1971).

On the positive side the cost/benefit model has led to a much more analytical and thorough analysis of action strategies. A great deal of effort has been expended toward developing conceptual schemes and measurement methods for assessing both the cost side and the benefit side (e.g.,

Chase, 1968; Dorfman, 1965; Glennon, 1972; Mangum, 1967). Much of the analysis has been in the arena of public expenditures on social programs but at least some of it might be translatable to Naval concerns.

One example that might be considered is illustrated by Fansel and Bush (1970), who define and present a method for measuring the effectiveness of a health service organization. In their attempt societal value questions are taken into account, at least partly, and an interval measure of effectiveness is arrived at.

First, they define the effectiveness of a health system in terms of positive changes in the functional history of the target population with which the system is concerned. They speak in relatively broad terms, such as a nationwide system, but their methods could also be applied to a much smaller population.

Then they operationally define health as the degree of function/dysfunction in the population. The function/dysfunction continuum is a set of ordinal states based on a person's ability to carry on his usual daily activities. This ordinal function/dysfunction scale is made into an interval scale by using a paired comparisons scaling technique. Expert judges (public health officials) compared each of the ordinal states to one another, making judgments like "X days in state 1 > Y days in state 2." The weights derived for the ordinal states in this manner create an interval scale of health.

Thus to assess the effectiveness of a health system, the population is measured at T_1 using the cardinal health scale (called the Health Status Index, HSI), the health system "intervenes" for a period, then measures are taken at T_2 . Of course, for large populations problems of control and attribution of cause and effect are difficult, but for relatively smaller samples these could perhaps be overcome. Fansel and Bush present some illustrative data from a small section of a tuberculosis control program.

Another positive feature of cost/benefit analysis, not so often recognized, is the reminder that we can perhaps learn something about the relative effectiveness of different strategies or organizational subunits by comparing their marginal rather than the average cost/benefit ratio (Glennon, 1972). For example, the benefits derived from a certain kind of technical school graduate (e.g., type XX) could virtually cease after a certain number (say N) had been produced. What's needed after that are type YY graduates (who could perhaps do more complicated things that were really irrelevant until the type XX's got all the basic problems cleared up). If the average cost/benefit ratio of having all type XX's versus having all type YY's were compared, the type XX school would look

more cost effective. However, if the ratios were compared via a marginal analysis it would be revealed that an effective training organization would switch strategies at a certain point.

The limitations of the cost/benefit model have also been well documented, especially as it relates to determining the effectiveness of social programs (Rivlin, 1971). For example, Hatry (1970) specifically addresses the measurement of effectiveness of governmental public programs. Measures of the effectiveness of these programs should reflect the basic, underlying objectives of the programs--the effects they have upon people and the expression of these effects in the appropriate units. He asserts this is not usually the case.

Rather, program effectiveness measures fall into three categories. The first category contains pure cost measures, and does not reflect effectiveness at all. The expenditures per pupil in an educational program is an example. A second category is workload measures, such as number of pupils per teacher, and physical standards, such as x hospital beds per 1000 people. Such measures reflect only indirectly, if at all, the effectiveness of programs. Hatry's third category includes those measures that are composites of some kind expressed in terms of one unit of measure, usually dollars. Such measures he terms "hocus-pocus." These are misleading he asserts, and also make and conceal value judgments better left to open debate among the citizenry's elected representatives.

To evaluate program effectiveness he suggests not doing any of the above. Rather, a clear specification of the objectives of a program must be done and measures of those objectives in whatever units are appropriate should be used. This results in multiple criteria, and these should not be made commensurable for the sake of creating a single index. Political decisions must be left to the political process, long term effects should be considered, and only measurable effects (these include those measured by subjective ratings) should be used.

Hatry's discussion rather neatly illustrates the two basic differences between the I/O psychology criterion model and the cost/benefit model. First, the cost/benefit model tries to get all measures of effectiveness combined into one composite while the I/O criterion model says it shouldn't be done. Second, the criterion model argues that effectiveness measures should be variables in close proximity to the individual's or organization's behaviors while the cost/benefit model will settle for outcome variables (e.g., average income) that are somewhat more distant and perhaps less under the control of the unit being evaluated.

Management by Objectives

Although Odiorne (1965) views management by objectives as a complete system of management planning and control, it could also be viewed in a more restrictive context as a model of organizational effectiveness. The details concerning the practice of management by objectives have been well described elsewhere (e.g., Humble, 1970) as well as its limitations as a management technique (e.g., Carroll & Tosi, 1973) and this material needn't be repeated here.

However, with regard to MBO as a model of organizational effectiveness, it perhaps bears repeating that the measures which the model specifies as the primary criteria of effectiveness are whether or not the organization has accomplished the concrete tasks that were previously identified as necessary. It represents the ultimate in a goal oriented model of effectiveness. Thus, rather than evaluating the organization on a single abstracted continuum such as the cost/benefit ratio or on several criterion continua, that are in some sense abstractions from specific task behaviors (e.g., productivity or profit), MBO says that effectiveness is some aggregation of specific, concrete, observable and quantifiable accomplishments and failures. Either an organization accomplishes a specific task that it is supposed to, or it does not.

Some relevant issues revolving around the MBO model are: (a) what group or individual sets the goals for a particular organization or unit; (b) to what extent is it realistically possible to define quantifiable goals for an organization or organizational unit; (c) how should the relative importance of each goal be judged; (d) to what extent is it possible to know whether or not an objective has been "accomplished"; and (e) is the organization willing to commit the necessary time and effort to the MBO procedure?

Assuming some resolution of the above questions can be found, the MBO model yields a definition of effectiveness that is unique to each organization. For a particular time period, each organization must specify in concrete detail the specific things it wishes to accomplish. The relevant measure of effectiveness is then an accounting of which objectives were accomplished and which were not.

The Organization Development Model

The term organizational development, or OD, means different things to different people. In the most general sense it could refer to any activity designed to effect some kind of change in an organization and

thus would include the efforts of psychologists, economists, industrial engineers, computer technologists, and many others. However, for the purposes of this report we would like to use a delineation similar to that of Bennis (1969) and restrict the term organization development to a class of behavioral science type intervention techniques which owes its historical antecedents to the pioneering work in T-group and sensitivity training at the National Training Laboratories, all of which began about 1948 (Bradford, Gibb, & Benne, 1964). A central concern of such techniques is to provide mechanisms by which organizational members can examine their behavior in the "here-and-now." Team building (French & Bell, 1963), process consultation (Schein, 1969), confrontation (Beckhard, 1969), the Managerial Grid (Blake & Mouton, 1969), and laboratory education (Bennis, 1969) are all variations on this basic theme. Intervention techniques such as job enrichment (Ford, 1969) and the Scanlon Plan (Lasieur & Purkett, 1969) do not fall in the same category.

While we have just delineated OD techniques in terms of strategies (independent variables if you will) used to bring about change, researchers and practitioners in the field also have theories, implicit or explicit, regarding the content of the dependent variables in which they are trying to effect changes, and it is to the OD model of effectiveness that we now turn.

While the OD model of organizational effectiveness is not clearly stated by most authors, it is reasonably apparent that OD adopts a systems view, not a goal model. For example, Beckhard (1969) and Bennis (1969) emphasize the systems aspects of OD. Very seldom are effectiveness outcomes mentioned by OD writers, researchers, or practitioners. If such things as profit, turnover, and the like are mentioned at all, it is in a fairly unsystematic and casual way and only after much discussion has been spent on such factors as increased individual openness, better communications, greater individual self-actualization, etc., and other indicators of what is considered to be a healthy system.

Further, in both theory and practice, OD practitioners typically go beyond a general statement of a systems model and seem to have a fairly specific kind of system in mind, which serves as a standard of an "effective" organization. This last statement must be immediately qualified by stating that there is certainly not complete unanimity among organization development specialists regarding the characteristics of this "ideal" system. Contrast, for example, the statement of Tannenbaum and Davis (1970) and Beer and Huse (1972). The former authors place strong emphasis on the use and effectiveness of therapeutic, interpersonal kinds of interventions and maintain that structural

interventions are less important, especially in the early stages of organization development. The latter authors hold that a clear-cut commitment to a particular kind of OD approach is not necessary for a successful OD program, that structural and interpersonal changes should go almost hand in hand, and that several kinds of system changes (aside from just interpersonal, therapeutic changes) are probably necessary if OD is to succeed. However, there does seem to be a consensus among OD types, rough though it may be, regarding a normative model of man and organization that permits one to depict an OD construct of organizational effectiveness.

Before we get to more specifics it might be well to take note of three overall assumptions that seem to underlie most OD activity. First, rapid and accelerating change is depicted as a fact with which both men and organizations must accept and cope (Bennis, 1969). The world is seen as changing in a variety of ways at an increasing rate. This implies that old ways of managing and organizing are no longer functional. The functional bureaucracy, in particular, is noted as being an outmoded model of organizations. Second, an optimistic point of view is taken toward the nature of man. Man is seen as reaching for growth, seeking self-actualization, and certainly much less in need of supervision in organizations than the conventional wisdom would imply. Almost any article or book dealing with OD will make this statement (Beckhard, 1969; Bennis, 1969; French & Bell, 1973; Margulies & Raia, 1972), but McGregor's statement on Theory X and Theory Y (1960) is still the most familiar and often quoted version. Third, though this is less often made explicit, organizations are viewed as existing primarily, if not solely, for the benefit of the individual members of the organization. French (1972) states, "One value, to which many behavioral scientist-change agents tend to give high priority, is that the needs and aspirations of human beings are the reasons for organized effort in society (p. 35)."

In addition to these three general values or assumptions most OD researchers and practitioners operate with some more specific set of organizational characteristics that define a healthy system. Several alternative lists of such characteristics are presented in Table 1. They represent only a sample, but we hope a representative one, of those available.

TABLE 1
 ALTERNATIVE SETS OF ORGANIZATIONAL EFFECTIVENESS
 CRITERIA OBTAINED FROM LITERATURE ON ORGANIZATION DEVELOPMENT

Dependent Variable	Source
1. High trust and support among organizational members	French (1972)
2. Confrontation (not avoidance) of problems	"
3. Knowledge based on authority as well as assigned role	"
4. Open communications	"
5. High satisfaction and enthusiasm for organizational members	"
6. Frequent synergistic solutions	"
7. Presence of group responsibility for planning and implementation	"
<hr/>	
1. Open, problem solving climate	Bennis (1969) pp. 36-37
2. Role authority supplemented with authority based on competence	"
3. Decision-making responsibility is located close to information sources	"
4. High trust among persons and groups throughout organization	"
5. Competition is relevant to work goals and collaborative efforts are maximized	"
6. The reward system recognizes both achievement of organizational goals (profits or services) <u>and</u> development of people	"

TABLE 1 (Cont.)

Dependent Variable	Source
7. High sense of ownership of organizational objectives throughout work force	"
8. Managers manage according to relevant objectives rather than according to past practices	"
<hr/>	
1. Organization managers work against <u>goals</u>	Beckhard (1969)
2. Form follows function	"
3. Decisions are made by and near the source of information	"
4. Reward system rewards all of the following <ul style="list-style-type: none"> . short-term profit & productivity . subordinate growth . creation of viable work group 	"
5. Communication is open in all direction	"
6. Conflict and conflict situations treated as problems to be solved	"
7. High "conflict" over ideas, none over interpersonal difficulties	"
8. Organization is an <u>open</u> system	"
9. Values and management strategy place emphasis on maintaining of integrity and uniqueness in an interdependent environment	"
10. "Action research" is the way of life for the organization, feedback mechanisms are built in	"

TABLE 1 (Cont.)

Dependent Variable	Source
1. Communication of information is reliable and valid	Schein (1965)
2. Internal flexibility and creativity in accordance with information	"
3. High integration and commitment to goals of organization	"
4. Internal climate is characterized by support and freedom from threat	"

French (1972) lists seven such desired end states: an increased level of trust and support among organizational members, confrontation rather than avoidance of problems, authority based on knowledge and skill as well as assigned role, increased openness in lateral, vertical, and diagonal communications, increased enthusiasm and satisfaction for organization members, increased frequency of synergistic solutions to problems (creative solutions in which all parties gain more through cooperation than through conflict), and increased levels of self and group responsibility for planning and implementation. Bennis (1969) lists nine normative goals which overlap French's a great deal but include a bit more specificity.

Taking the assumptions and normative goals outlined above, a picture of the "effective organization," according to OD, begins to emerge. Such an organization will be aware of, open to, and reactive to change. It will be searching for new forms and methods of organizing. It will have an optimistic view of its members, allowing them room to self-actualize and trusting them with the responsibility for their own efforts. It will also seek to insure the satisfaction of its members since that is its reason for existence. To these ends, conflict will be confronted, not avoided, and communication will occur freely and effectively.

Beckhard's (1969) list conveys his belief that most researchers and practitioners possess a strong consensus concerning what a healthy organization is, even though it may differ somewhat from one individual to another. He portrays this consensus by presenting a synthesized list of ten characteristics that define an effective or healthy organization (Beckhard, 1969, pp. 10-11).

1. "The total organization, the significant subparts, and individuals manage their work against goals and plans for achievement of these goals."
2. "Form follows function (the problem, or task, or project determines how the human resources are organized)."
3. "Decisions are made by and near the sources of information regardless of where these sources are located on the organization chart."
4. "The reward system is such that managers and supervisors are rewarded (and punished) comparably for:
 - . short-term profit or production performance,
 - . growth and development of their subordinates,
 - . creating a viable working group."
5. "Communication laterally and vertically is relatively undistorted. People are generally open and confronting. They share all the relevant facts including feelings."
6. "There is a minimum amount of inappropriate win/lose activities between individuals and groups. Constant effort exists at all levels to treat conflict and conflict situations as problems subject to problem solving methods."
7. "There is high 'conflict' (clash of ideas) about tasks and projects, and relatively little energy spent in clashing over interpersonal difficulties because they have been generally worked through."
8. "The organization and its parts see themselves as interacting with each other and with a larger environment. The organization is an 'open system.'"
9. "There is a shared value, and management strategy to support it, of trying to help each person (or unit) in the organization maintain his (or its) integrity and uniqueness in an interdependent environment."
10. "The organization and its members operate in an 'action-research' way. General practice is to build in feedback mechanisms so that individuals and groups can learn from their own experience."

Summary.

From this brief view of what the organizational development view of the effectiveness construct seems to be, perhaps the following summary statements are in order.

1. OD concentrates its efforts on achieving a normative state whose "worth" is accepted on a priori grounds. That is, the OD model assumes that if an organization can achieve the state characterized by a list such as Beckhard's, it will be effective as an organization and will be optimally equipped to carry out its mission(s).
2. Almost all the variables have to do with the human part of an organization, far less with technological or material aspects of the organization.
3. Carrying (2) further, these human variables predominantly have to do with phenomena of intra- and inter-group behavior.
4. Finally, to support its assumptions empirically OD would have to demonstrate several relationships. First, OD specialists must connect their intentions (goals) with their actions (intervention technique) and the results of their actions (measures of the effect of their interventions). Having proved that: (a) they are trying to do as they say and (b) are successful in what they are trying (i.e., have achieved the normative state that is their goal for the organization), they must then prove (c) their success has produced an effective organization. That is, is the organization that achieves the OD normative goal state also an effective organization? OD has largely bypassed the problem of defining and measuring organizational effectiveness by, in effect, assuming it.

Thus we are left with the prospect of a process that may produce effective organizations, but where no one knows how or why, much like our ancestors viewed the production of their descendants. The great amount of superstition surrounding those ancient events was eventually dispelled by literally "getting inside" the process, beginning with the illegal examination of cadavers. Perhaps it is time to examine the dead.

The Likert-ISR Model

In somewhat of a class by itself is a systems model of organizational effectiveness that can be attributed to a cohesive group of researchers and practitioners at the University of Michigan. They include Floyd Mann, J. R. P. French, Stan Seashore, Rensis Likert, David Bowers, and others. Since Likert has written the most influential statement of this model (Likert, 1963, 1967), we will label it as his, even though he is not the sole contributor.

Flowing from the classic study by Coch and French (1948), the basic variable defining an effective system is participation in decision making, or shared power. That is, to the extent that individuals can truly participate in making the decisions that will affect them, the organization will be more effectively equipped to accomplish its mission. Over the years, continued research and consulting work at Michigan (e.g., Katz, Maccoby, and Morse, 1950) has added to the list of systemic variables believed to constitute an effective organization.

In his 1967 statement, Likert used the term "Systems 4" to label what he considered to be the standard for a healthy and effective organization. The actual state of an organization was assessed via a questionnaire intended to measure the perceptions of organizational members. The organizational characteristics tapped by this instrument are listed in Table 2.

TABLE 2
ORGANIZATIONAL VARIABLES USED TO
DESCRIBE THE STATE OF THE SYSTEM

1. Leadership processes used
 - a) Extent to which superiors have confidence and trust in subordinates
 - b) Extent to which subordinates, in turn, have confidence and trust in superiors
 - c) Extent to which superiors display supportive behavior toward others
 - d) Extent to which superiors behave so that subordinates feel free to discuss important things about their jobs with their immediate superior
 - e) Extent to which immediate superior in solving job problems generally tries to get subordinates' ideas and opinions and make constructive use of them

TABLE 2 (Cont.)

2. Character of motivational forces

- a) Underlying motives tapped
- b) Manner in which motives are used
- c) Kinds of attitudes developed toward organization and its goals
- d) Extent to which motivational forces conflict with or reinforce one another
- e) Amount of responsibility felt by each member of organization for achieving organization's goals
- f) Attitudes toward other members of the organization
- g) Satisfaction derived

3. Character of communication process

- a) Amount of interaction and communication aimed at achieving organization's objectives
- b) Direction of information flow
- c) Downward communication
 - 1. Where initiated
 - 2. Extent to which superiors willingly share information with subordinates
 - 3. Extent to which communications are accepted by subordinates
- d) Upward communication
 - 1. Adequacy of upward communication via line organization
 - 2. Subordinates' feelings of responsibility for initiating accurate upward communication
 - 3. Forces leading to accurate or distorted upward information
 - 4. Accuracy of upward communication via line
 - 5. Need for supplementary upward communication system
- e) Sideward communication, its adequacy and accuracy
- f) Psychological closeness of superiors to subordinates (i.e., friendliness between superiors and subordinates)
 - 1. How well does superior know and understand problems faced by subordinates?
 - 2. How accurate are the perceptions by superiors and subordinates of each other?

4. Character of interaction-influence process

- a) Amount and character of interaction
- b) Amount of cooperative teamwork present
- c) Extent to which subordinates can influence the goals, methods, and activity of their units and departments
 - 1. As seen by superiors
 - 2. As seen by subordinates

TABLE 2 (Cont.)

- d) Amount of actual influence which superiors can exercise over the goals, activity, and methods of their units and departments
 - e) Extent to which an effective structure exists enabling one part of an organization to exert influence upon other parts
5. Character of decision-making process
- a) At what level in organization are decisions formally made?
 - b) How adequate and accurate is the information available for decision making at the place where the decisions are made?
 - c) To what extent are decision makers aware of problems, particularly those at lower levels in the organization?
 - d) Extent to which technical and professional knowledge is used in decision making
 - e) Are decisions made at the best level in the organization as far as
 - 1. Availability of the most adequate and accurate information bearing on the decision
 - 2. The motivational consequences (i.e., does the decision-making process help to create the necessary motivations in those persons who have to carry out the decision?)
 - f) To what extent are subordinates involved in decisions related to their work?
 - g) Is decision making based on man-to-man or group pattern of operation? Does it encourage or discourage teamwork?
6. Character of goal setting or ordering
- a) Manner in which usually done
 - b) To what extent do the different hierarchical levels tend to strive for high performance goals?
 - c) Are there forces to accept, resist, or reject goals?
7. Character of control processes
- a) At what hierarchical levels in organization does major or primary concern exist with regard to the performance of the control function?
 - b) How accurate are the measurements and information used to guide and perform the control function, and to what extent do forces exist in the organization to distort and falsify this information?
 - c) Extent to which the review and control functions are concentrated
 - d) Extent to which there is an informal organization present and supporting or opposing goals of formal organization

TABLE 2 (Cont.)

- e) Extent to which control data (e.g., accounting, productivity, cost, etc.) are used for self-guidance or group problem solving by managers and nonsupervisory employees, or used by superiors in a punitive, policing manner
8. Performance goals and training
- a) Level of performance goals which superiors seek to have organization achieve
 - b) Extent to which you have been given the kind of management training you desire
 - c) Adequacy of training resources provided to assist you in training your subordinates
-

Note.--Likert, Rensis. The human organization: Its management and value. New York: McGraw-Hill, 1967, 197-211.

Further research has led to a different, but not very different, conceptualization of an effective organization. It is outlined in Taylor and Bowers (1972) along with a revision of the questionnaire instrument used to assess the state of the organization. The major variables measured by the current version and thus the definition of an effective organization are presented in Table 3.

TABLE 3
PERCEIVED DIMENSIONS OF ORGANIZATIONAL
CHARACTERISTICS ASSESSED BY THE SURVEY OF
ORGANIZATION'S QUESTIONNAIRE (TAYLOR & BOWERS, 1972)

1. Climate: perceived total impact upon a work group of the behaviors of superior work groups in terms of:
 - a) High or low concern for human resources
 - b) Adequacy of communications flow
 - c) Nature of motivation to perform
 - d) Decision-making practices
 - e) Technological readiness and flexibility
 - f) Amount of lower level influence in departmental decisions
2. Supervisor leadership
 - a) Support: behavior that enhances someone else's feeling of person worth and importance
 - b) Interaction facilitation: behavior that encourages members of the group to develop close, mutually satisfying relationships

26.

TABLE 3 (cont.)

- c) Goal emphasis: behavior that stimulates an enthusiasm for meeting the group's goal or achieving excellent performance
 - d) Work facilitation: behavior that helps achieve goal attainment by such activities as scheduling, coordinating, planning, and by providing resources such as tools, materials, and technical knowledge
3. Peer Leadership
- a) Support
 - b) Interaction facilitation
 - c) Goal emphasis
 - d) Work facilitation
4. Interpersonal processes within work groups
- a) Confidence and trust among members
 - b) Strong, shared motivation toward goal attainment
 - c) Effective group decision making
 - d) Effective, open communication within the group
 - e) Mutual help and coordinated activity
 - f) Flexibility, adaptability, and creativity
 - g) Job competence through skill upgrading
5. Satisfaction with:
- a) Supervisor
 - b) Work group
 - c) Job
 - d) Organization
 - e) Pay
 - f) Past progress within the organization
 - g) Future expected progress within the organization
6. Performance
- a) Volume of work
 - b) Efficiency
 - c) Product quality
 - d) Attendance
 - e) Organizational and manpower growth and development
 - f) Human costs (e.g., accident rate, health, stress, grievances)
-

There is obviously a great deal of similarity between the Michigan characterization of an effective organization and the OD characterization as portrayed by Beckhard's list and many of the same summary statements apply. However, certain differences should also be noted. First, the Michigan group is much more research oriented and has devoted more effort to developing measures of their systems variables and to linking these variables with outcome measures such as profitability and turnover. As a result their variables are more concretely defined, although some would argue (e.g., Argyris, 1968) that the concreteness is illusory. Second, the Michigan list is not quite so heavily oriented toward interpersonal and self-actualization type variables. Third, as we shall see later the Michigan model is not quite so wedded to T-group related techniques for improving an organization's score on the specified characteristics.

The Operations Research (OR) Model

In some respects this model represents both the goal-centered and the systems view of effectiveness. It has also incorporated much of the work on military "readiness."

Ackoff and Sasieni (1968) describe Operations Research (hereafter called OR) as an applied discipline with three essential characteristics:

1. a system or executive orientation
2. use of interdisciplinary teams
3. application of scientific methods to problems of control.

They define OR as "the application of scientific method by interdisciplinary teams to problems involving the control of organized (man-machine) systems so as to provide solutions which best serve the purposes of the organization as a whole (p.6)."

It appears that OR, as a discipline, should be concerned with the construct of organizational effectiveness. Certainly any discipline which sets out to provide solutions to organizational problems such that the "whole" organization improves should have some ideas about conceptualizing, measuring, and bringing about improvements in organizational effectiveness.

Much of what follows is based on Ackoff and Sasieni's (1968) Fundamentals of operations research. In this text the authors state that OR's method is to build formalized models of the systems with which the decision makers are concerned. The models which have been developed vary considerably in their mathematical complexity, but they all start from virtually the same rather deceptively simple beginning, to wit:

$$U = f(X_i, Y_j)$$

where U is the overall utility or value of the system's performance, X_i are the variables that can be controlled, Y_j are variables (and constants) that are not controlled but do affect U, f is the relationship between U and X_i and Y_j .

OR does not have a model of the firm which allows it to optimize U in the above equation. Instead the OR approach uses ". . . multiple models, each representing a part of the system, [and these are] made to interact with one another so as to obtain approximately optimal solutions to planning problems (p. 444)."

This tactic of breaking down the overall problem of optimizing organizational effectiveness into optimizing the performance of subsystems as they interact has led to the practical definition of several prototype problems, and Ackoff and Sasieni (1968) present a list. They cite these eight:

1. Allocation. The problem of dividing up the available resources among the jobs to be done. The usual objective is to allot an insufficient amount of resources so that total costs are minimized or total return is maximized.
2. Inventory. The problem is to control the existing and usable, but idle, resources. Again the objective is to control inventory so that costs are minimized or profits are maximized.
3. Replacement. The problem is to make efficient decisions about the replacement or maintenance of equipment used by the organization. There are three types of problems: replacement of or maintenance of major capital equipment sometimes used indefinitely but at a steadily increasing cost (with age); replacing equipment in anticipation of complete failure; selecting a preventative maintenance scheme designed to reduce probability of failure.
4. Queuing. This ". . . problem consists of either scheduling arrivals or providing facilities, or both, so as to minimize the sum of the costs of waiting customers and idle facilities (p. 249, italics theirs)." Customers are not necessarily people but can be letters requiring signatures, cars needing gasoline, airplanes requiring passengers, etc.

5. Sequencing and coordination. The first problem, sequencing, consists of selecting an appropriate order to service waiting customers (see 4 above for comments on customers), while the second deals with the amount of effort put into the tasks of a job or product that must be performed in a particular sequence, as well as when these tasks should be scheduled. The objective in coordinating is, of course, to optimize the overall job or project performance. These problems are also sometimes critical path problems. The program evaluation and review technique (PERT) is an example of a specific procedure for sequencing and coordinating.
6. Routing. This problem occurs when there is a network of some kind, most usually in transportation and communication processes. The problem consists of choosing a route between two points in the network (from among several possible routes) so that the least cost is incurred. Usually, because of practical limitations, not all alternative routes can be tried, so some other more efficient way of picking this route must be found.
7. Competitive. These kinds of problems occur in situations where relevant variables are controlled by others, whose concerns or interests may conflict with your own. Although not identical to competition, conflict problems also fall under this heading. There are three main types of conflict: fights (eliminate the opponent), games (outwit the opponent), and debates (convince the opponent). Competitive theory has concerned itself mainly with the first two modes of conflict.
8. Search. All of the above problems assume that the relevant information is already in hand or can be obtained. In search problems, the information must be found. In such problems, the actions to be taken are known if only the required information could be obtained. Some common search problems are accounting audits, exploration for mineral deposits, and information storage and retrieval.

Each of these areas has developed modeling techniques and solutions to frequently occurring situations. As noted by Ackoff and Sasieni and others (Caywood, 1970; Engel, 1969), this approach has a number of shortcomings.

Overall then, the OR approach is to study an organization (system), break it down into subsystems, define models for those subsystems, solve these models for optimal performance, and implement the indicated procedures. Over the course of the years, recurring problems have led to the definition of standard models as outlined above.

What we would like to do now is sample some specific OR contributions that have special relevance for the conceptualization of organizational effectiveness. This is not to say that the "classic" articles of queuing, allocation, etc., are not pertinent to organizational effectiveness. They are, but apply to subsystem optimization primarily. (This will be discussed further in the summary remarks.)

Hayward (1968) has examined the concept of combat effectiveness; that is, the organizational effectiveness of a military organization in a combat situation. His article is primarily conceptual and deals with the nature of such measurement, the qualities it should possess, and how to go about quantifying such a measure. We would like to discuss his argument since it is the only article that deals directly with an effectiveness construct, and thus might serve as a standard.

According to Hayward, a satisfactory measure of combat effectiveness should: (a) order military units in terms of combat effectiveness, (b) have operational significance, (c) incorporate a definition of effectiveness that is intuitively acceptable to those using it. Thus, "it should embody a concept that is in harmony with those called to the mind of a military man by the term 'combat effectiveness.'" To Hayward, the definition of combat effectiveness as the probability of success in combat operations meets these requirements.

Hayward denotes combat effectiveness (as defined above) as $P(S)$, and posits the equation:

$$P(S) = f(X,Z)$$

where X represents friendly unit capabilities and Z represents the factors of enemy, environment, and the combat mission. (Note the similarity to Ackoff and Sasieni's general equation.) Average combat effectiveness, however, would only be a function of X , friendly unit capabilities. This is probably close to a concept called combat readiness, since the exact enemy, environment, and mission for any particular unit remains unknown for most occasions, and only its own capabilities are known.

The composite set X is usually thought of as being made up of five variables called combat functions: (1) intelligence, (2) firepower, (3) command, control, and communications, (4) mobility, and (5) logistic support. Hayward views these as distinct sets of variables.

Finally, Hayward considers the pros and cons of alternative methods of measuring combat effectiveness. Analysis of performance under actual combat conditions is the best way, but impractical. Historical combat records could be analyzed, but are subject to the usual shortcomings of archival data (selective deposit and survival, irrelevance for this purpose, incomplete, etc.) as well as applying only to past combat situations. Rejecting these two approaches, Hayward argues the prediction of combat effectiveness using (a) presently existing data, (b) theory, and (c) expert judgment constitute a more feasible and practical approach.

There are three basic approaches to this prediction: (a) intuitive, relying on military judgment alone; (b) war gaming, a more rigorous application of military judgment in clearly specified situations, usually by a simulation technique; and (c) a paper-and-pencil mixture of empirical data, theoretical analysis, and military judgment aimed at solving the equation outlined above. Hayward favors the last approach.

Regarding the validity of the results of this approach, Hayward notes that, in the absence of an actual combat situation performance check, "the most that can be claimed for any proposed measure of combat effectiveness is not that it is 'correct,' but that the arguments upon which it is based are clear (i.e., capable of being analyzed and debated in a meaningful way), logically consistent, and in general accord with the judgments of military experts (p. 322)." His arguments are well taken and we will have occasion to come back to them.

In much the same vein, but not in a military context, Ansoff and Brandenburg (1971, 1971) present two papers outlining a rational approach aimed at matching the design of an organization to its purpose and situation. They present no empirical data on such matches. Furthermore, their discussion is limited to profit-seeking organizations and utilizes a language familiar to the businessman. They do not deal at all with the "informal" organization, saying they ". . . shall assume that accommodations to personalities, styles, and limitations in the skills of individuals are made through adjustments in the basic form [of the organization]."

Given these limitations and adjustments the authors first present the criteria an organizational design must meet, and then briefly review some historical organizational forms in light of these criteria. Only their criteria will be presented here.

First, they present an ultimate criterion and three sub-ultimate criteria, all stated in outcome terms. Maximizing return is the ultimate criterion, while the three sub-ultimate criteria are: (a) maximizing near-term performance, (b) achieving long-term growth, and (c) protecting the firm against catastrophic risks.

They present no operational forms for the above since they believe present knowledge does not permit measurement of such criteria. Instead, process criteria must be used to evaluate an organization. Their process criteria are what we have been referring to as systemic or state variables. They group these criteria into four categories.

Steady State Efficiency.

Measures of efficiency when the levels of throughput and the nature of throughput remain stable over time.

Operating Responsiveness.

Measures of the abilities of an organization to make quick, efficient changes in levels of throughput.

Strategic Responsiveness.

Measures of the firm's ability to respond to changes in the nature of its throughput (such as caused by obsolescence, technological change, etc.).

Structural Responsiveness.

Measures of the capabilities of an organization to change itself.

Within each of these categories they have 12-20 different measures, stated in logical, not operational, terms (such as economics of scale, synergy, logistic activities located where source resources are available).

The Ansoff and Brandenburg arguments represent some common themes running through much of the OR type literature. In essence, these are that the OR model realizes there are ultimate criteria of organizational functioning but since they are so hard to conceptualize and measure, the next best thing is to measure variables that represent the state of the system. Thus the model of organizational effectiveness implicit in the OR approach seems to have both goal oriented and systems oriented elements, although the nature of the state or systems variables felt to be important are considerably different than those posited by the behavioral science OD orientation.

Many OR theorists and researchers emphasize the role expert judgment must play in defining and measuring organizational effectiveness. A problem arises: should organizational decision makers focus on just one of the system's criteria at a time, or should an attempt be made to take all the criteria into account? This problem is especially acute when a decision must be made about committing future resources. Papers by Childs and Wolfe (1972), Geoffrion, Dyer, and Feinberg (1972), Turban and Metersky (1971), Terry (1963), and Dean and Mishry (1965) all address this problem in one form or other.

On the whole, their methods specify a procedure something like this:

- a) identify appropriate sets of experts
- b) use these experts to:
 1. identify the multiple performance criteria
 2. use some scaling procedure to weight this set of criteria (again employing the expert's judgment)
 3. apply a mathematical model to combine the components of this set or vector of criteria to create a single index
 4. in the case where several alternative values are assigned to the multiple criteria, as when evaluating one weapon system against another (Albert, 1963), select that vector which gives the maximum value when the mathematical model is applied.

Most of the variation in such a procedure occurs in the selection of a particular scaling technique and the particular mathematical model used to combine the vector or evaluate alternative vectors of criteria (Childs & Wolfe, 1972; Geoffrion et al., 1972; Terry, 1963). Pacher (1968) presents a good conceptual descriptions of the three major ways of evaluating alternative effectiveness vectors (pp. 238-239). However, Eckenrode (1965) evaluated the efficiency of six methods of collecting expert judgments on the relative value of a set of criteria and concluded there were no significant differences in the final criterion weights derived.

To give the flavor of the specific kinds of variables that have tended to fall within the OR orientation, we offer the following examples.

Kind (1965) applied a discriminant function technique to the problem of personnel assignment in an organization. In King's technique the hyperspace containing personnel measures is partitioned so that the joint probability that each individual will be a success in the job he is assigned is maximized. However, this job success is defined only as a global, dichotomous measure; the value of success of any job is assumed to be independent of the value of success on any other job. Interval scales for all variables are also assumed and one may

argue with the adequacy or validity of these methods or assumptions. For instance, it is probably not realistic to believe that a global dichotomous measure of job success is adequate for assigning personnel.

Swinth (1971) presents an organizational design for dealing with complex and novel problems--such as creating new products. He presents no empirical data but rather a normative model that he asserts will meet this problem. It is essentially a set of organizational "centers" linked to solve a problem, each center performing certain functions such as searching for goals, searching for solutions, etc. A kind of Delphi technique is applied to the centers, and they iterate on a problem until an overall solution is found. Swinth lists these systemic characteristics as necessary for his design to work: Participants accept the overall goal, participants are capable in their own areas of responsibility, and are able to communicate efficiently.

Reufli (1971) presents a mathematical model that represents the attempt of one unit of a decentralized organization to alter its goals in response to the behaviors of another unit. If his model adequately represented reality, it could perhaps be used to predict unit behavior in the future by the use of a simulation study. However, no empirical data that evaluates the model's accuracy is presented.

Ritti and Goldner (1969) discuss the problem of conflict in the modern technological corporation. Their ideas are based on a six-year study of a large American corporation (using interview and survey techniques). Briefly, they present an alternative model to the classic manager-professional conflict presented elsewhere. They believe that conflict occurs between functional units that are usually organized along technical (or professional) lines as a result of competition over scarce organizational resources. Conflict is thus between different coalitions that each contain both managers and professionals, rather than between professionals and managers. (These authors are social scientists, not typical OR types.)

Finally, Arrow (1964) discusses pricing systems as a means of achieving managerial control in an organization, managerial control being the systemic criterion variable of interest. For Arrow, control consists of choosing operating rules and then finding ways of enforcing those rules so that the organization's "objective function" is maximized. His solution, as already mentioned, is an intraorganizational price system:

In the purest form, a price is attached to each commodity or service produced or consumed by any activity in the organization; if the commodity is sold to, or brought from, other firms, the transfer price has to

be the same as the market price (with some modifications in the case of imperfect competition). The operating rule for the manager of each activity is then to maximize its profit, as computed by valuing its inputs and outputs at the transfer prices (p. 404).

Arrow lists four difficulties in the application of this approach: the choice of enforcement rules (really how to punish and reward managers based on their profit measures), the complexity of operating rules (how and at what level to set prices), limits on the theoretical validity of the price system, and the presence of uncertainty (which leads to managers adopting "play it safe" strategies and thus not "optimizing").

Summary.

In total, these studies present a mixed bag. However, perhaps the following can be offered as a summary.

- . Little empirical data is presented, where it is, it is usually an illustration of some hypothesized mathematical model.
- . The construct of organizational effectiveness usually is not directly addressed. Rather it is finessed by using a mathematical model of some sort to arbitrarily combine whatever multiple measures of organizational performance are used.
- . No systematic programs of research for investigating organizational effectiveness appear. Rather, each new problem or organization encountered is treated anew, except that there appears to be a reasonably common set of procedures for identifying criteria and for determining the relative values for these criteria.
- . Variables like morale, satisfaction, participatory decision making, managerial skills, size, technology, climate, etc., are not addressed. Instead, only those variables that appear to be directly related to a readily measured outcome criteria and which can be manipulated by management are considered. Furthermore, there appear to be no attempts under way to systematically identify just what these variables might be. It may be that such information does exist, perhaps in a kind of informal professional lore, but it does not exist in the recent journal literature.
- . It was also evident from our review that the basic tactic of optimizing subsystem performance with the belief this optimizes overall system performance is not universally acknowledged valid (Hatry, 1970).

- . OR methods, as outlined in their texts and journals, are aimed at the control problem of organizations rather than the humanization problems (Ackoff, 1973). That is, OR attempts to increase the effectiveness with which organizations serve their own purposes rather than the effectiveness with which they serve the purposes of their parts (human beings). This is probably the reason that morale, satisfaction, and the like seldom occur as important variables and why Ansoff and Brandenburg (1971) assume away the "informal" organization when they are theorizing about organizational design. Bennis (1965), when comparing Organization Development to OR, points to this as the crucial difference between these two approaches. OD concentrates on the "people" type variables and OR on the economic and engineering variables. Both fields are right and both are wrong, if that kind of judgment is necessary. Beer (1973), an OD type, notes that both realms of variables must be tapped if a truly system-wide intervention is to be made in an organization. Indeed, Ackoff and Sasieni devote an entire chapter to "Implementing and Controlling the Solution" which largely addresses the problems encountered when organizational personnel resist OR solutions.
- . The general OR point of view is a decision-making, optimizing one, and concerned almost totally with upper-management problems.
- . OR gives best results when it handles organizational problems where (a) specific goals representing organizational or operational purposes can be formulated, (b) quantitative effectiveness measures which reflect the operational achievement of these goals exist or can be constructed (Engel, 1969). OR does not work well where the basic goals are not defined and system operation is not understood (Caywood, 1970).

Please keep in mind that these points are not meant as direct criticism of OR efforts. Rather, they are meant to show some of the limitations of OR literature for illuminating organizational effectiveness as a construct. In contrast, a major OR strength is the ever present emphasis on using fairly rigorous techniques to identify and measure organizational performance measures for each organization encountered, primarily by applying psychological scaling techniques to the judgments of organizational experts.

OR does present a unique combination of the goal and systems approaches to organizational effectiveness. The typical OR approach is to define the goals of an organization, then look at the system set up to attain those goals to determine ways of improving its

operation. This also points up another strength of OR already mentioned--the heavy involvement of organizational members (in the form of expert judgments collected with fairly rigorous data collection techniques) in the definition and measurement of organizational objectives.

Finally, OR does have an extensive literature dealing with optimal solution of specific problems encountered by organizations (the eight prototype problems mentioned in the first section). This constitutes an effective intervention technique, and anyone hoping to improve an organization's performance would be well advised to take advantage of these solutions.

Summary of Alternative Models of "Effectiveness" Construct

It is probably not time well spent to make comparative statements about these various models as to which is better or worse for some purpose. They really provide a means for looking at different parts of the effectiveness construct and rather than choose among them a more viable objective should be to put them together and use the complimentary insights provided by each. Strangely enough it is the systems models that make the clearest pronouncement as to the specific nature of an effective organization. For example, if one were to focus exclusively on the OD model the paramount task would be to develop measures for variables such as those listed by Beckhard (1969). On the other hand, the goal models suggest that the first task of research might be to develop methods for identifying an organization's task goals; and secondly, to develop criterion measures of the degree to which the goals are being achieved. We will have research to suggest along both these lines.

IV. DEPENDENT VARIABLES OF ORGANIZATIONAL EFFECTIVENESS

Introduction

This section attempts to identify and define the specific dependent variables of organizational effectiveness that have been used, or suggested for use, in empirical studies of organizational effectiveness and to summarize the relationship of each dependent variable to other variables (dependent or otherwise).

Readers will find named here almost every variable ever mentioned in the literature of organizational behavior science. It was not the intent to achieve an exhaustive review of each variable, but we did attempt to exhaust the information on each variable relative to its role as a dependent variable or organizational effectiveness. Similarly, an attempt was made to look only at studies that were in some way empirical, and that used organizations, or work groups, as their primary unit of analysis.

As has been discussed above, the construct of organizational effectiveness can be looked at from many points of view. Consequently, it should come as no surprise that a comprehensive examination of research and theory dealing with the measurement of organizational effectiveness would produce a plethora of variables which are difficult to relate to one another. Nevertheless we have tried to produce a catalogue of such variables if for no other purpose than to have them all amassed in one place. To do this we wrote the label and definition on a separate index card each time anything vaguely resembling a measure of effectiveness was actually used in a research study or suggested by someone as a variable having potential as a measure of effectiveness. We then tried to sort the cards into piles or clusters that were relatively homogeneous in terms of the definition of the variables. After several sortings and resortings the list in Table 4 seemed to represent the data best. On subsequent pages each of these variables is defined and elaborated further, and illustrative references are discussed. At the end of the discussion of each variable a chart is presented which summarizes each study cited in terms of: (a) the sample used, (b) the operational form(s) of the variable under consideration, (c) the variables it was related to, and (d) the nature of the relationship which was found. However, for some of the variables no empirical studies were found and thus no summary charts appear. Once the complete catalogue is presented we will have some summary remarks to make about the nature of the list.

The variables in the review are arranged in no particular order except that the ordering vaguely represents a number of continua. For example, the variables progress, at least in part, from "objective" to "subjective" measures. They also progress, in a sense, from the distal to the proximate. This does not imply that those appearing early are better measured than those appearing late or that they are any more or less valuable.

We should add at this point that the variables discussed here were not the only ones abstracted from the literature. For the complete list of variables we attempted to achieve a division into at least a tri-otomy consisting of independent variables (or inputs that could be manipulated), dependent variables (or the outcomes that are of real interest and that constitute some sort of payoff), and intervening variables (or the "given" characteristics of organizations that, depending on the degree to which they are present, might make a difference in the way a change in an independent variable affects a dependent variable). It sounds simple; obviously, it's not. For example, should organizational structure be taken as a "given" and viewed as some kind of moderating variable, or is it something that can be manipulated as an independent variable? In organizations with long traditions such as the Navy maybe it must be taken as a given, but maybe not. In general, there are serious and important questions to be asked about which characteristics of organizations are manipulable "handles," which are the outcomes of real interest upon which the organization's payoff is based, and which act as constraints on, or modifiers of, the intended effects of pulling the handles. We will take up a discussion of the intervening and independent variables in later sections.

Obviously, the items on the list also vary a great deal in terms of the degree to which they have been operationalized, or have the potential for being operationalized. Not all of them have appeared in empirical studies. Some exist only as suggestions.

TABLE 4
SUMMARY LISTING OF DEPENDENT VARIABLES GLEANED FROM A
 SURVEY OF THE ORGANIZATIONAL EFFECTIVENESS LITERATURE

Overall Effectiveness
 Productivity
 Efficiency
 Profit
 Quality
 Accidents

TABLE 4 (Cont.)

Growth
 Absenteeism
 Turnover
 Satisfaction
 Motivation
 Morale
 Control
 Conflict/Cohesion
 Flexibility/Adaptation
 Goal Consensus
 Role and Norm Congruence
 Managerial Task Skills
 Managerial Interpersonal Skills
 Information Management and Communication
 Readiness
 Utilization of Environment
 Evaluations by External Entities
 Stability
 Internalization of Organizational Goals
 Value of Human Resources

Overall Effectiveness

Overall effectiveness is intended to be a general evaluation that takes in as many single criteria as possible and results in a general judgment about the effectiveness of the organization, such that a set of organizations could be rank ordered on a single continuum. Overall effectiveness has been measured primarily by two methods. One is the use of archival performance records, either singly or in some combined form. The other is by overall ratings or judgments obtained from persons thought to be knowledgeable about the organization.

Perhaps the major determinant of whether a measure is discussed in this section is the intent of the investigator. For example, if a measure of productivity or profit is intended as a measure of overall organizational effectiveness then it is included here.

Archival Performance Measures.

Lieberson and O'Connor (1972) and Grusky (1963, 1964) and Eitzen and Yetman (1972) used records that are obtainable without directly consulting or entering the organization being measured. Lieberson and O'Connor consulted Moody's Industrial Manual and Moody's Transportation Manual to obtain sales, net earnings, and profit margins for 167

companies across a twenty-year period (1946-1965). Grusky used the final league standings of major league baseball teams as a measure of their overall effectiveness, while Eitzen and Yetman used won-lost records of college basketball teams. One potential advantage of using these kinds of records is their relative freedom from bias compared to records controlled and kept only by the individual organization.

Ivancevich and Donnelly (1970) used organization records as a measure of overall effectiveness. These included records of absence (two types), turnover, market potential ratio, number and size of orders, efficiency, direct selling costs, and route density factor. Their sample consisted of 31 sales branches of a marketing organization.

Bachman, Smith, and Slesinger (1966) used a standard score of dollar productivity as a measure of effectiveness for 36 sales offices.

Smith and Ari (1963-1964), Indik, Georgopoulos, and Seashore (1961), and Georgopoulos (1965) all used a measure of actual time to complete a task or "standard unit of work" compared to an "allowed" time to complete the unit of work as a measure of effectiveness. (All these studies used a sample of delivery organizations.) Work group members' scores were averaged to obtain an organizational (or work group) score.

Hall and Lawler (1970) used the sum of six "objective" variables as a measure of the effectiveness of 22 research and development organizations. The six variables were: net change in research and development budget in the last year, number of new outside contracts, number of new internally funded contracts, percentage of projects meeting their time schedule, number of contracts renewed, and percentage of projects meeting the cost budget.

Ratings of Overall Effectiveness.

Several techniques of obtaining ratings have been used, but all require the use of persons thoroughly familiar with an organization's performance to do the ratings.

Nealey and Blood (1968) used a single superior's rating on a four-point Likert scale as a measure of a work unit's effectiveness. Rowland and Scott (1968) also used a single superior's rating, but on two, ten-point Likert scales ("amount of work done" and "quality of work done") as a measure of a unit's overall effectiveness. (Presumably these ratings were summed.)

Hall and Lawler (1970) had the directors of research and development organizations rate their own units on a six-point scale of "global technical performance." Mahoney and Weitzel (1969) used a single global effectiveness rating by a person one level higher than the unit being rated.

Tannenbaum (1961-1962), Indik, Georgopoulos, and Seashore (1961), and Georgopoulos (1965) all used an average rating as an indicator of organizational effectiveness. In these studies, a number of judges rated each unit on a single Likert scale of overall effectiveness, and their mean rating was taken as the unit's score.

Aram, Morgan, and Esbeck (1971) had three judges separately rate 16 research groups on "overall performance outcomes" using the paired comparison method. They found high enough agreement to feel justified in combining the judges' ratings. Zald (1967-1968) used a forced comparison ranking procedure on three dimensions (overall efficiency, quality of programming, board of director's strength) to obtain organizational effectiveness scores for 37 YMCA organizations. Their rankings were made by two persons familiar with the organizations.

Finally, Bowers (1964) obtained a ranking of life insurance agencies in terms of overall effectiveness. This ranking was done by "company officials."

Other Measures.

In a different vein, Friedlander (1966) obtained a factor he called "Group Effectiveness" from a factor analysis of 70 variables. These variables were measured on five-point Likert type items and nine semantic differential items and deal with various work group behaviors (Friedlander's Group Behavior Inventory). This factor deals with small work group behavior only, and its highest loading items were: "the group is an effective problem solving team"; and "group meetings result in creative solutions to problems."

Friedlander and Pickle (1968) attempted to obtain a measure of organizational effectiveness by determining the extent to which the needs of five societal "components" that transact with the organization were being satisfied. The five components are: customer, supplier, creditor, community, and government. All components were separately measured with Likert-type questionnaire items or archival data such as credit ratings, membership in local organizations, etc. Friedlander and Pickle found that of the organizations they studied (97 firms, from the retail, service, wholesale, manufacturing, and mineral extraction areas) most were not very successful at concurrently fulfilling the needs of these "components." Also, the intercorrelations among the "need fulfillment" scores for the five societal components were quite low.

Finally, Hall and Lawler (1970) summed objective performance scores, global technical performance ratings (both described above), and a global administrative performance score to obtain a composite performance index.

Summary of Overall Effectiveness Measures.

Both organizational records and organizational personnel have been tapped in the effort to get a measure of an organization's overall effectiveness. Since there is no direct method of determining which procedure, the use of archival records or subjective ratings is better, we might hope for a construct validation approach in which the reliability, content validity, dimensionality, etc., of the variables was extensively examined. However, the amount of such "criterion" research that exists is almost nil and the relevance of these measures is largely by assumption. This is unfortunate since both procedures are potentially valuable and probably tap different sources of variance.

Given that both methods are useful, there is the problem of combining them. First, there is the question of whether these diverse measures should be combined at all, and if they should be, then there is a second problem of how they should be combined. At present there appear to be no easy answers. In fact, if these questions could be definitely answered, the problem of measuring organizational effectiveness would largely be solved, and an adequate theory of organizational effectiveness would likely be at hand. Mahoney and Weitzel's (1969) approach (discussed in more detail in a later section) of combining variables in a multiple regression formula to predict a global effectiveness rating is the clearest attack on this problem in the psychological literature. However, even here, only subjective rating measures were combined, and many of these are not measures of effectiveness, but rather of the predictors of effectiveness.

Summary of Relationship of Effectiveness to Other Variables.

The relationship of effectiveness to other variables is presented in the index of the studies on overall effectiveness. However, the following summary is offered. Measures of overall effectiveness have been found to have no relationship to: team collaboration and consensus (Aram et al., 1971), three facets of satisfaction (Bowers, 1964), coercive, expert, and legitimate power bases (Ivancevich & Donnelly, 1970; Nealey & Blood, 1968), several measures of supervisor traits (consideration, initiating structure, intelligence, esteem for subordinates, cognitive complexity, and several "needs") (Nealey & Blood, 1968; Rowland & Scott, 1968).

Measures of effectiveness have been found positively related to: total organizational control or influence (Bachman et al., 1971; Bowers, 1964; Smith & Ari, 1963-1964; Tannenbaum, 1961-1962), all five sources of

supervisory power (Bachman et al., 1971), some sources of supervisory power (Ivancevich & Donnelly, 1970), satisfaction with superiors, managers, and peers (Bachman et al., 1971; Bowers, 1964), a statistical factor tapping "Business Volume" (Bowers, 1964), participation in organizational training laboratories (Friedlander, 1967), consistency, congruence, and consensus of group norms (Georgopoulos, 1965; Smith & Ari, 1963-1964), the quality of superior-subordinate relationships (Indik et al., 1961), organizational competence, reality-testing, adaptability, integration, and identity (Olmstead, 1972), degree of "upward influence" of the supervisor (Rowland & Scott, 1968), morale (Smith & Ari, 1963-1964), organization size and degree of democratic supervision (Tannenbaum, 1961-1962).

Measures of effectiveness have been found negatively related to: a statistical factor tapping "Business Costs" (Bowers, 1964), occupational, educational, and hierarchical level of work group members and group size (Friedlander, 1966), and rate of succession of managers (Grusky, 1963-1964; Eitzen & Yetman, 1972).

Finally, Mahoney and Weitzel used a multiple regression equation with 24 factors based on questionnaire items to obtain an R of .76 with overall effectiveness (across 283 organizational subunits). In addition, Hall and Lawler (1970), investigating 22 research and development units, found several significant correlations between a number of interviewing variables (need satisfaction, quality pressure, time pressure, financial responsibility pressure, and job involvement) and effectiveness. They also found a significant correlation between an independent variable (direct customer responsibility) and effectiveness.

Overall Effectiveness				
Source	Sample	Operational Form	Related To	Relationship Found
Aram, Morgan & Esbeck (1971)	Scientists, engineers, and lab technicians for a rubber manufacturer. 16 work groups.	Three experts used paired comparison technique to rate the 16 work groups on overall performance.	Paper and pencil measures of team "collaboration" and "consensus", 3 separate dimensions.	No significant correlations found.
Bachman, Smith & Slesinger (1966)	36 sales offices, mean N in office = 18.	Standard scores of dollar productivity for the office, for offices with comparable experience levels.	Measures of "control", power bases, and satisfaction with office manager.	Almost all correlations significant at .05 level or higher. Levels of correlation in the .35-.45 range.
Bowers (1964)	40 life insurance agencies.	Ranking by company officials on basis of total performance.	Seven statistical factors of agency performance, 5 facets of agent satisfaction, "total control", and control at 4 levels of the organization.	"Total control" was higher in the top 20 ranked agencies than the bottom 20 ranked agencies. Control at one of the 4 organizational levels was significantly correlated with effectiveness (.59, $p < .001$). Effectiveness correlated -.44 with "Business costs" and .53 with "Business volume". All other statistical factors did not significantly correlate with effectiveness. Satisfaction with regional manager and fellow agents correlated significantly positively with effectiveness (.53, .81, resp., $p < .05$), the other three satisfaction facets did not correlate significantly.
Friedlander (1966)	91 members of a government research and development organization, from 3 hierarchical levels. 12 groups.	Statistical factor defined by six semantic differential items, dealing with evaluation of group meetings in a generalized, "feeling" sense. KR-20 = .89, test retest $r = .64$, (6 months).	Group mean factor scores correlated with 4 demographic variables: age, tenure, occupational and educational level; and size of group, and group hierarchical level.	Negatively correlated with occupational level, educational level, and group size. Thus larger groups with better educated and employed individuals evaluated their groups' meetings less favorably.
Friedlander (1966)	91 members of a government research and development organization, from 3 hierarchical levels. 12 groups.	Statistical factor named "Group effectiveness" defined by nine highly loading questionnaire items, dealing with evaluation of a group's performance. The questionnaire was devised on the basis of previous interviews with organization members, and theory. KR-20 = .90, test retest $r = .80$, (six months).	Group mean factor scores correlated with 4 demographic variables: age, tenure, occupational and educational level; and size of group, and group hierarchical level.	Negatively correlated with occupational and educational level, and with group size and hierarchical level. Thus large groups, high in the organization with highly educated members of higher occupational levels saw themselves as less effective groups.

Overall Effectiveness (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Friedlander (1967)	91 members of a government research and development organization, from 3 hierarchical levels. 12 groups.	Statistical factor named "Group effectiveness" defined by nine highly loading questionnaire items, dealing with evaluation of a group's performance. The questionnaire was devised on the basis of previous interviews with organization members, and theory. KR-20=.90, test retest $r = .70$, (six months).	Participation (or not) in organizational training laboratory sessions.	Compared 4 "treated" groups to 8 control groups on gain (before-after design) scores on the factor scores. Treated groups showed more gain, but final scores were not significantly different since control groups had higher initial scores.
Friedlander & Pickle (1968)	Questionnaires and archival records on 97 small businesses of diverse types.	The extent to which 5 "components" interacting with an organization were satisfied or fulfilled, as shown by questionnaires and archival data. Internal consistency reliability coefficients for the five measures were .60, .65, .77, .92, and .96.	The fulfillment of "owner" and "employee" needs.	Correlational analysis revealed few significant associations between fulfillment of the various needs of "components" and "owners" and "employees".
Grusky (1963-1964)	Records of major league baseball teams for periods 1921-41 and 1951-58.	Team standing at end of season.	Rate of succession of managers.	Correlations of rate of succession and team won-lost records were $-.40$ ($p < .02$) and $-.60$ ($p < .001$), for periods 1921-41 and 1951-58, resp.
Georgopolous (1965)	32 stations of a retail merchandise delivery organization.	Average worker productivity data (units of time to complete work compared to a standard), average overall performance ratings given to the stations by several judges.	Measures of group norms, the consistency, congruence, and consensus of same, as well as "normative member activities".	Measures of association (correlations and phi's) were in the .25 to .64 range between effectiveness and normative measures.
Hall & Lawler (1970)	Directors and researchers in 22 R&D units engaged in applied and developmental research.	A global technical performance rating of each unit by the director of that unit; an "objective" performance rating - the sum of the following six variables - change in R&D budget, new inside and outside contracts, percent of projects meeting cost and time schedules, number of contracts renewed; a composite index using the above two measures plus a global rating of administrative performance.	Several measures, 5 hypothesized as intervening variables, need satisfaction, quality pressure, time pressure, financial responsibility pressure, job involvement and 4 hypothesized as independent variables; range of projects, job challenge, independent research, budget account direct customer responsibility.	Several significant correlations between independent-intervening, and intervening-effectiveness measures found. One significant independent-effectiveness correlation (direct customer responsibility with global performance rating, $r = .57$, $p < .10$). Job challenge, direct customer responsibility, independent budget research account, and quality and financial pressure - account for most of the significant correlations.

Overall Effectiveness (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Indik, Georgopoulos, & Seashore (1961)	27 stations of a retail delivery merchandise organization.	Average worker productivity data (units of time to complete work compared to a standard), average overall performance ratings given to the stations by several judges.	Eight variables topping superior-subordinate relationships of communication, satisfaction, mutual understanding, and influence over operations.	In general, the effectiveness and productivity scores were positively correlated to the superior-subordinate measures at the group level of analysis. Differing results found at individual and intra-group levels of analysis.
Ivanovich & Donnelly (1970)	31 sales branches of a marketing organization. (N= 394 individuals).	Eight archival measures — measuring absence, turnover, costs and efficiency, orders, and market factors, taken over a 24-week period prior to and following administration of a leadership influence questionnaire.	Questionnaire tapping a group's perception of their leader's amount of the five power bases (independent, expert, reward, coercive & legitimate) plus his "incremental influence".	Coercive and legitimate power not correlated with any of the eight effectiveness measures. Reward power had one correlation reaching significance at .05, expert 2, referent 5, and "incremental influence" 6. However, the highest r was -.32. (excused absence and incremental influence)
Lieberson & O'Connor (1972)	167 companies listed in Moody's Industrial Manual and Moody's Transportation Manual over the period 1946-65.	The sales, net earnings, and profit margins for the companies as listed in the two manuals.	Leadership changes (president of company or chairman of board), industry type, position of company within the industry.	Leadership accounted for 6% of sales, 7% net earnings, and 14% profit margin variances. These were small amounts compared to industry type and company position variables.
Mahoney & Weitzel (1969)	Members of 283 organizational subunits from a variety of kinds of organizations.	A rating of the overall effectiveness of the subunit by the subunit supervisor's superior, 9-point Likert scale.	24 statistical factors in a stepwise regression equation (it was the dependent variable).	R=.76 for all 24 dimensions, R=.74 for a subset of seven.
Nealey & Blood (1968)	Supervisors and their units in a hospital (22 immediate supervisors, 8 second level supervisors)	Four Likert ratings of the units performance by the unit's immediate supervisor, on scales of patient care, knowledge of patients' needs, human relations and global performance.	Various measures of unit supervisors. LPC, L8DQ, years experience, Wonderlic IQ, esteem for immediate subordinates, and expert and legitimate power.	The LPC scores for second level supervisors correlated with all four performance measures of the unit. None of the other variables significantly correlated.

Overall Effectiveness (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Olmstead (1972)	10 groups of 12 experienced military officers performed in an eight hour long simulation of company commanders engaged in internal defense operations.	Experienced field grade officers used pre-established criteria to evaluate the groups on "extent of mission accomplishment".	Measures of four components of Organizational Competence — Adaptability, Reality-testing, Integration, and Identity derived from Bennis' and Schein's work. All measures were derived from analysis of the groups' communications.	Correlations between effectiveness scores and the competence component scores were: .96 (reality testing), .79 (adaptability), .22 (integration), and .58 (identity). Correlation between effectiveness and Competence (a composite of the four components) was .68.
Rowland & Scott (1968)	58 first line supervisors and 673 subordinates in two departments of a naval ammunition depot.	Work groups were rated by three superiors above the group's supervisor, on two 10 point scales — amount of work done and quality of work done.	Supervisor LOQ scores (consideration) ratings of supervisors by superiors on seven scales of "upward influence", measures of cognitive complexity (Role Construct Repertory Test & Baron Welsh Art Scale), intelligence (Purdue Adaptability Test), and several needs (Edwards Personal Preference Schedule).	Correlations were computed. The seven scales of upward influence were all highly positively correlated with the two effectiveness measures. ($p < .01$), range of r 's = .66 to .92. However, note that these are all ratings by the same person (the three superiors over the group's supervisor). No other measures correlated significantly with the effectiveness measures except EPPS Aggression (.40 with Quality, $p < .01$).
Smith & Ari (1964)	Nationwide delivery organization, drivers and supervisors, 32 separate stations with a total of 1200 employees comprised the sample.	Average productivity for a station (average of individual productivity scores), station member "Morale" scores (one questionnaire item).	Measures of total amount of control, degree of democratic supervision, and attitudinal consensus of station members.	Productivity was significantly positively correlated with every variable but democratic supervision (not significant). Morale was significantly positively correlated to all measures. (Morale and productivity correlated .34).
Tannebaum (1961-1962)	Stratified random sample of 104 of 1000 League of Women's Voters units.	Overall effectiveness rating of each unit by 29 judges familiar with the unit (5 point scale). Average rating used.	Total control and degree of democratic form of control (uses the "control graph").	Partial correlations (size partialled out, since it correlated .55 with effectiveness), were .29 and .31, for total control and democratic control, respectively, with effectiveness.

Overall Effectiveness (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Zald (1967-1968)	37 units in a YMCA in metropolitan Chicago.	Units were rated by two persons who knew their operations well on three phases - "overall efficiency", "quality of programming", and "board of directors strength". Used forced comparison ranking procedure.	Several demographic variables peculiar to the geographic area were related to the effectiveness variables.	Percentage of business leaders on board of directors, number of people employed in the area, and expenses of the unit all correlated positively with the three ratings of effectiveness. Percentage of middle-management board of directors members correlated negatively with the ratings.

Productivity

Productivity has been measured at three levels: individual, group, and total organization and is usually defined as the quantity or volume of the major product or service that the organization provides and is generally measured by using organization records of some sort. Ratings are also employed, and in at least one case, observation of ongoing work was used to obtain a measure of production. Some examples of each of these are as follows.

Organization Records (Archives).

Parker (1963, 1965) and Katzell, Barrett, and Parker (1961) conducted their research in pharmaceutical warehouses and used units per man-hour (units being items processed in filling orders) for a productivity measure. This figure was computed for an entire warehouse and thus is a measure of a total organization's productivity. Lodahl and Porter (1961) and Rosen (1970) computed work group productivity measures from organization records. The former authors used the monthly percentage of time standards achieved by each work group (their sample consisted of maintenance shop work groups for an airline), standardized for work centers within the shop. Rosen, studying workers in a furniture factory, used mean quantities produced for a work group productivity measure. Kavcic, Rus, and Tannenbaum (1971) used net productivity per worker, average wages per worker, and ratio of organization income to costs (all in dollars) as measures of productivity. Their sample was taken from four manufacturing plants in Yugoslavia. Finally, Marcus (1971), studying welfare case workers, used the proportion of visits made by individual case workers to clients' homes as a measure of productivity.

Whitely and Frost (1961), though not constructing any measures of their own, mentioned the following as measures that have been used to indicate the productivity of individual researchers or groups of researchers (in form of sums or means): number of papers published, number of books authored, awards received, positions held in scientific bodies, and editorships held. Box and Cotgrove (1968) employed addresses to scientific societies and patents as measures of researcher production, besides published papers.

The Michigan researchers (Bowers, 1964; Seashore & Yuchtman, 1967) derived statistical factors based on organization records that purportedly measure productivity. Both studies utilized analysis of 70 or more variables from records obtained from a large number of insurance agencies. Three different factors that seemed to tap productivity were

found: "Business Volume," defined by policies in force, new sales, renewal premiums, lives insured, and manpower; "Member Productivity," defined primarily by one variable, new business per agent; and "New Member Productivity," defined by production per new agent and ratio of new to old agents. This study will be discussed in some detail in a later section.

Ratings.

Several studies illustrate the use of subjective measures of production. Box and Cotgrove (1968) asked scientists to rate "how normal they regarded their research performance in comparison to other scientists engaged in similar work." Somewhat similarly, Meltzer and Salter (1962) asked physiologists to report how many papers they had published in the previous three years. This is highly similar to archival records and should, of course, be identical to such measures (mentioned above), if the physiologists reported accurately.

Student (1968) and Kavcic, Rus, and Tannenbaum (1971) used ratings by others, not self-ratings, as productivity measures. Student had managers of appliance manufacturing plant work groups rate the groups on the extent to which the work group stayed ahead of or on schedule, and/or required additional help to stay on schedule. Kavcic et al. had 17 "experts" rank order four Yugoslavian industrial plants in terms of their productivity (no definition given to the experts, just the term itself).

Mahoney and Weitzel (1969) had managers at least one step higher than the immediate supervisor of a work group or organizational unit rate the unit on a number of effectiveness indicators. Factor analyses of data obtained from 283 organizational units suggested the existence of a productivity factor. This study will also be discussed in some detail in a later section.

Observation.

Beek (1964) used several observational measures, all converging on percentage of a work cycle (an assembly line was being observed) that was idle or wait time. This is an inverse measure of productivity, of course.

Relationship to Other Variables. The relationship of productivity, however it has been measured, to other variables is generally unclear. Several studies that operationalized productivity and then related it to some other variable are summarized in the index. There appears to be no simple summary of these studies.

Attitudinal variables tapped by perceptual measures sometimes appear to have little relationship to productivity or to be complexly related (Bowers, 1964; Box & Cotgrove, 1968; Lodahl & Porter, 1961; Student, 1968). However, Katzell, Barrett, and Parker (1961) found satisfaction positively correlated with productivity, and Marcus (1962) found work group cohesion and perceptions of supervisor orientation related to productivity. Kavcic et al. (1971) found several attitudinal variables related to productivity but their N was very low and their results are at best suggestive. Finally, Parker (1963) found significant correlations between productivity and attitudes about recognition and performance instrumentality.

Meltzer and Salter (1962) found no relationship between productivity and organization size while Parker (1963) found a negative relationship.

Katzell et al. (1961) found productivity positively related to profit and an efficiency measure (product-value productivity), and Meltzer and Salter found a positive relationship between the funds available to an organization and its productivity.

Seashore and Yuchtman (1967) examined the stability of the scores on their productivity factors over a ten-year period, with mixed results, one factor being unstable, another moderately so, and the third highly stable.

Summary.

Productivity has been measured in many ways and its relationships with several types of other variables have been examined. However, due to the uniqueness of its measurement generalizations are difficult to come by.

Productivity				
Source	Sample	Operational Form	Related To	Relationship Found
Beek (1964)	Assembly line workers, N=226, in an electronics plant in the Netherlands.	Losses in production time (due to: waiting for material, variations in individuals work speeds) as measured by observation of the assembly lines, expressed as percentage of work cycle that is wait time.	No other formal variables, author instituted experimental changes in the technological organization of the assembly line.	Losses in production time were decreased.
Bowers, (1964)	40 life insurance agencies.	Statistical factor derived from factor analysis of 70 archival performance records. Called "Business volume", a measure of dollar volume for the agency during previous years.	Estimates by agents of "total control", control at 4 levels of the organization, and an overall effectiveness ranking by company officials.	Not significantly correlated with "total control", and only significantly correlated to control at one of the 4 levels of the organization (.31, $p < .05$). Significantly correlated with overall effectiveness ranking. (.53, $p < .05$)
Box & Cotgrove (1968)	Eight research laboratories in chemical and pharmaceutical industries.	Two measures, both individual in nature but summed or averaged to get organizational scores. Objective measure — number of published papers, scientific society addresses, patents. Subjective measure — asked scientists "how normal they regarded their research performance in comparison to other scientists engaged in similar work".	Measures of "Organizational Freedom" and "Dedication to Science".	Interactive relationship between "freedom", "dedication", and subjective productivity. Both variables were directly related to number of publications, but not patents.
Katzell, Barrett, & Parker (1961)	72 wholesale warehousing divisions in the drug and pharmaceutical industry.	Number of products processed in filling orders per man hour of production. (Aggregate figure for an entire warehouse)	Four other measures of effectiveness (quality, profit, product-value productivity, & turnover), five situational variables, and scores on a satisfaction questionnaire.	Significantly positively correlated with profit and product-value productivity, negatively correlated with four of the five situational variables (which meant that warehouses in small towns were more productive than large-city warehouses), positively correlated with satisfaction.
Kaucic, Rus, & Tannenbaum (1971)	Four manufacturing plants in Yugoslavia.	Seventeen experts rank ordered the four plants according to their productivity, and used three archival records — net productivity per worker, average wages per worker, and ratio of income to costs — all in dollar terms.	Questionnaire measures of control, participation, and job motivation, involvement and identification.	Generally, positive relationships found. Scores on productivity ranked the plants the same as scores on the other measures in most cases. Low N (4) prevented any statistical significance testing.

Productivity (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Lodahl & Porter (1961)	62 groups of shop workers at a maintenance base of an airline.	Monthly percentage of time standards achieved by the group, standardized for their work center (similar kinds of work performed in a center)	The Supervisory Abilities and Decision Making Approach scales of Ghiselli's Self-Description Inventory, a measure of work group cohesion, and need for cooperation with other groups.	Variables were correlated, only 8 of 34 correlations were significant at .10 level or lower. In general the DMA scales scores were unrelated to productivity of the group, while some patterns of the Supervisory scale were related to Productivity. Authors conclude that no simple explanation accounted for the relationships that were found.
Marcus (1962)	12 work groups of case-workers in an urban Dept. of Welfare, 5 case workers and a supervisor per group.	Proportion of visits made by workers to the clients' homes.	Measures of cohesion (workers named their 5 best friends in the office and the oral interaction of workers was observed), and supervisor orientation ("procedure" or "group oriented")	More cohesive units were less productive, and groups with "group-oriented" supervisors were more productive than "procedure-oriented" groups. Author reports no quantitative data, only conclusions.
Meltzer & Salter (1962)	Mail survey of 786 physiologists.	Self-report of number of papers published in the previous 3 years.	Six variables: freedom, chance to do good job, funds available in org., adequacy of facilities, ability, and institution type — as well as size of and levels in the organization.	Size of organization not related to productivity, numbers of levels is related (curvilinear). This latter effect appears only in large organizations when size is controlled. All but "Facilities" of the other six variables were significantly related to productivity.
Parker (1963)	80 warehouses of a pharmaceutical company. N=1716 work groups.	Number of items processed per man-hour of production.	Measures of work group attitudes (toward supervision, recognition, and instrumentality of performance), supervisory behavior (LOQ), and situational variables (warehouse size, security wage rate, unionization, and percentage males).	Significant correlations with productivity were found for warehouse size, -.25 ($p < .05$), recognition, .25 ($p < .05$), and performance instrumentality .52 ($p < .01$).

Productivity (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Rosen (1970)	Seven work groups in a furniture factory. (Ten individuals per work group).	Mean quantity produced for a work group.	Measures of management pressure, proportion of time worked on a single furniture model, group cohesion, foreman preference, group consensus on foreman preference, and desire to earn money before and after experimental manipulation (short-notice foreman shift).	Studied pattern of intercorrelations among the variables after the shifting of foremen. Generally, low correlations of productivity with other measures immediately after treatment, gradual increase to former levels, except desire to earn money correlated higher than before manipulation.
Seashore & Yuchtman (1967)	75 insurance agencies	Statistical factor derived from analysis of archival records, called "New Member Productivity", defined by production per new agent, ratio of new to old agent productivity.	None, analyzed for stability over a ten-year period. Three measurements taken -- 1952, 1957, 1961.	No stability over time. Correlations of factor scores were: 1952-1957, -.13, 1957-1961, .15, 1952-1961, .02.
Seashore & Yuchtman (1967)	75 insurance agencies	Statistical factor derived from analysis of archival records, called "Member Productivity", defined by new business per agent.	None, analyzed for stability over a ten-year period. Three measurements taken -- 1952, 1957, 1961.	Fairly stable over time. Correlations of factor scores were: 1952-1957 -.71, 1957-1961 .71, 1952-1961 -.53.
Seashore & Yuchtman (1967)	75 insurance agencies	Statistical factor derived from analysis of archival records, called "Business Volume", defined by policies in force, new sales, renewal premiums, lives insured, manpower.	None, analyzed for stability over a ten-year period. Three measurements taken -- 1952, 1957, 1961.	Highly stable over time. Correlations of factor scores were: 1952-1957 .96, 1957-1961 .95, and 1952-1961 .91.
Student (1968)	40 work groups in an appliance manufacturing plant.	Rating by management people of the extent to which the work group stayed ahead of or on schedule or required additional help to stay on schedule.	The five power bases plus "incremental influence" (referent & expert power).	No significant relationships found.

Efficiency

Efficiency is usually thought of in terms of a ratio that reflects a comparison of some aspect of unit performance to the costs incurred for that performance. There have been relatively few attempts to operationalize this concept, and all but one of these is a measure taken directly from organization records or a factor derived from such records.

Seashore and Yuchtman (1967) and Bowers (1964) used factor analytic techniques to derive factors that reflect costs and/or efficiency. Seashore and Yuchtman's factors were called "Maintenance Cost," defined by the variables of cost per collection, and cost per \$100 of premium; and "Production Cost," defined as cost per sale, cost per \$1000 (of insurance face value, I assume), and cost per \$100 premium. Bowers' factor was named "Business Costs" and was defined by the variables of business unit costs and renewal business costs.

Katzell, Barrett, and Parker (1961) operationalized a variable they called "product-value productivity" by computing the sales dollar value per man hour of production. This figure was an aggregation over individuals and was intended to reflect the efficiency of an entire pharmaceutical warehouse.

Student (1968) broke costs into four categories and then had managers rate work groups on these four categories. The cost categories were: indirect--amount of labor used by a work group in production; maintenance--amounts used for maintenance; supply--allowance for supplies; and scrap--amounts for scrap and rework.

Many authors attempt to define efficiency and suggest ways for measuring it (Davis & Valfer, 1966; Henderson & Dearden, 1966; Katz & Kahn, 1971; Kuin, 1968; Goodman, 1970; Likert, 1967; Likert & Bowers, 1969; McCleod, 1971; Thompson, 1967; Whitely & Frost, 1971), but few have actually attempted such measurement. Some of these suggested methods are waste and scrap figures, down time, performance against a schedule, transfer pricing, marginal costs, schedule overruns, and labor productivity. Most of them are archival in nature as were the operationalized versions actually used in the previously mentioned research studies.

Relationship to Other Variables.

Efficiency has been found to be negatively correlated with the following variables: total control in an organization, amount of control at specific hierarchical levels, overall effectiveness (Bowers, 1964), and

"urbanization" measure (Katzell et al., 1961), and "coercive" power (Student, 1968). It has been found positively related to profit (Katzell et al., 1961), expert power, referent power, reward power, and "incremental influence" or expert plus referent power (Student, 1968).

Seashore and Yuchtman investigated the stability of the scores on their factors reflecting costs or efficiency, finding intermediate stability over a ten-year period.

Summary.

Efficiency usually has been measured by archival data and its relationship to other variables has been sparsely investigated. What has been done yields no conclusive statement.

Efficiency				
Source	Sample	Operational Form	Related To	Relationship Found
Bowers (1964)	40 Insurance Agencies	Statistical factor based on archival records, called "Business Costs".	Estimates by agents of "total control", control at several levels of the whole organization, and an overall effectiveness ranking by company officials.	The factor correlated -.55 with "total control", ($p < .005$), -.44 with overall effectiveness ranking ($p < .05$), and was also significantly negatively correlated with amount of control at three of four levels of organization. ($p < .05$).
Katzell, Barrett, & Parker (1961)	72 wholesale warehousing divisions, drug & pharmaceutical products	Sales dollar value per man-hour of production (over entire warehouse)	Other organizational performance measures: profit, quality, turnover & an "urbanization measure."	Negatively related to "urbanization", positively correlated with profit, no relation to quality or turnover.
Seashore & Yuchtman (1967)	75 Insurance Agencies	Statistical factor based on archival records, called "Maintenance Cost"	None, analyzed for stability over an 11-yr. period, three measurements taken, 1952, 1957, 1961.	Intermediate stability correlations of factor scores were: 1952-1957 = .60, 1957-1961 = .33, 1952-1961 = .24.
Seashore & Yuchtman (1967)	75 Insurance Agencies	Statistical factor based on archival records, called "Production Cost"	None, analyzed for stability over an 11-yr. period, three measurements taken, 1952, 1957, 1961.	Intermediate stability, correlations of factor scores were: 1952-1957 = .41, 1957-1961 = .61, 1952-1961 = .33.
Student (1968)	40 appliance manufacturing plant workgroups	Management ratings of work group efficiency in four areas: indirect, maintenance, supply, scrap.	Five power sources, (French & Raven) correlations.	Indirect efficiency strongly related to referent power, moderately to expert and referent; Maintenance negatively related to coercive power, supply positively related to expert and reward power, scrap positively related to referent power. Incremental influence (expert plus referent) related scrap and supply efficiency.

Profit

Profit is typically thought of as the amount of revenue from sales left after all costs and obligations are met. It is sometimes given further meaning by thinking of it as a return on the investment used in running the organization from the owner's point of view or as a percent return on total sales.

Almost exclusively, profit is measured by archival records. Katzell, Barrett, and Parker (1961) used the ratio of profit to total dollars of sales as a measure of "profitability" (pharmaceutical warehouses comprised their sample). Stagner (1969) computed two kinds of profit measures: profit as a percentage of sales and profit as a percentage of capital (or return on investment). He took his figures from Fortune's data on the top 500 American firms. Lawrence and Lorsch (1967) employed several varieties of profit measures--change in profits over the last five years, change in sales volume over the last five years, and percentage of current sales volume accounted for by products developed within the last five years. The last two measures are actually not profit per se, but are closely related.

Kavcic, Rus, and Tannenbaum (1971) employed a unique approach. Rather than using archival records to obtain profit figures, they used a panel of experts to rank order four plants in terms of their "economic success."¹ These plants were located in Yugoslavia.

Operationalizing the profit variable is largely an accounting task. In most cases, the necessary figures are obtainable in company records and it remains to compute the measure. However, even in the four studies cited here, we can see that several methods of computing profit exist. Also, in the workaday world, profit is not always computed so as to reflect the performance of the organization but to serve some other end. For example, profits are taxable and it may be in the organization's best interest to keep them hidden.

Relationship to Other Variables.

The relationship of profit to other measures is complex, since it is affected by many factors beyond the organization's control, such as the general state of the economy. Stagner found that scores on four statistical factors (cohesiveness, formality in decision making, decentralization, and personalized management) did discriminate significantly ($p < .01$) between the top and bottom thirds (in terms of profit) of his sample of 109 large firms. Katzell et al., found profit negatively correlated with five measures of the "urbanization" of pharmaceutical

warehouses, but positively correlated with measures of quantity produced, efficiency, and worker satisfaction. They found no relationship between profit and quality of work or turnover.

Kavcic et al. found profit positively related to measures of control, participating motivation, involvement, and identification in four Yugoslavian manufacturing plants. However, since N equals only four, these results are best viewed as suggestive.

Finally, the Lawrence and Lorsch results seemed to indicate that organizations with high "differentiation" and high "integration" (that is, diverse subunits to meet diverse environments, but effectively tied together) were effective and had higher profits. However, their study sacrificed methodological rigor to explore new areas, as they themselves readily point out.

Summary.

Profit is usually computed from archival records, though the methods of deriving the index seem to vary considerably. It seems that profit is positively related to most other measures of organizational well-being. When an organization is making money it appears that all seems well.

Profit				
Source	Sample	Operational Form	Related To	Relationship Found
Katzell, Barrett, & Parker (1961)	72 wholesale warehousing divisions, drug and pharmaceutical products.	Net profit from sales as a ratio to total dollars of sales.	Other organizational performance measures: quantity, efficiency, quality, turnover; five measures of "urbanization", and satisfaction.	Significantly negatively correlated with all five measures of "urbanization" (small town warehouses more profitable than large city warehouses), positively correlated with quantity, efficiency (product-value productivity), not correlated with quality or turnover. Significantly positively correlated with satisfaction.
Kavcic, Rus, & Tannenbaum (1971)	Four manufacturing plants in Yugoslavia. N ranged from 650 - 1995, plants manufactured rubber, shoes wood products (2).	Rankings of the plants by 17 "experts" in terms of their economic success.	Questionnaire measures of control, participativeness, and motivation, involvement, identification.	Positive relationships in all cases, though no significance figures reported (due to low n, 4).
Lawrence & Lorsch (1967)	Interviews and questionnaires on 216 managers, scientists, and engineers in six organizations in the chemical industry.	Three archival measures, change in profits for previous five years, change in sales volume for previous five years, percent of current sales volume accounted for by products developed within the last five years. Organizations were ranked on these indices.	Several measures of organizational differentiation, integration, and members goal, time, and interpersonal orientations, and modes of conflict resolution.	Results difficult to summarize, but seem to indicate that organizations with both high differentiation and high integration were most effective in the particular environments these organizations had. However, as the authors state, many methodological "niceties" were ignored in this study.
Stagner (1969)	109 large firms listed in Fortune's 500.	Profits as percentage of sales and profits as percentage of capital.	Four factors derived from questionnaire data, completed by 217 executive from the 109 firms. Factors were: cohesiveness, formality in decision-making, decentralization, and personalized management.	Scores on all four factors significantly discriminated ($p > .01$) top and bottom thirds for profit as percent of capital; cohesiveness and d.m. formality discriminated top and bottom thirds for profits as percent of sales.

Quality

The quality of the primary service or product provided by the organization may take many operational forms, which are largely determined by the kind of product or service provided by the organization.

Almost all operational measures of quality found in the literature use archival data, specifically the kinds of measures typically thought of as being "quality control." Beek (1964) examined assembly line inspectors' charts to determine numbers of short circuits, assembly faults, and soldering faults per 1000 units. Parker (1963, 1965) and Katzell, Barrett, and Parker (1961) used number of errors in filling orders and pricing per 1000 man-hours of production in their work with pharmaceutical warehouses. Their measures were aggregate figures, representing either an entire work group or warehouse's quality of work.

Seashore, Indik, and Georgopoulos (1960) in their study of a package delivery organization used a count of non-deliveries over a one month period for a measure of an individual's work quality. For units, they used the mean of the individual's measures.

Student (1968) used a rating of actual vs. anticipated numbers of rejects in an appliance manufacturing plant as a measure of quality.

It appears that much more could be done than has been done to measure quality. All the measures mentioned above are archival in nature, taking advantage of existing records. Likert and Bowers (1969) suggest some other possible measures of quality: accuracy, customer returns, complaints, and repeat business. It should also be possible to develop some subjective measures of quality to compliment archival measures, such as ratings of the quality of a unit's work by the unit that receives their product (e.g., airplane pilots evaluating a maintenance unit's work, mechanics the supply department's work, etc.).

Relationship to Other Variables.

Beek found that quality of an assembly line worker's work was related to his work pace, with moderately and regularly paced individuals producing higher quality than irregular or slow personnel.

Katzell et al. found quality unrelated to quantity of work, profit, or turnover, but negatively related to the degree of "urbanization" of the organization.

Parker found that pricing and order-filling errors correlated positively, and that "initiating structure" of work group foremen was positively correlated with pricing errors (but not order-filling errors). He found size of the organization (warehouse in this case) correlated positively with order-filling errors, but employment security negatively correlated. Thus it appears that close supervision and a large organization are associated with low quality of work.

Seashore et al. found errors (i.e., non-deliveries) negatively correlated with effectiveness, productivity, and accidents and positively correlated with absences.

Student found that his measures of expert power, referent power, and the "incremental influence" of supervisors correlated positively with quality.

Summary.

Quality is measured primarily by making use of existing organizational records (e.g., measuring or counting errors). Most of its relationships to other variables appear to make intuitive sense, at least, which gives one some reason to believe the measures used are accurate reflections of quality.

Quality				
Source	Sample	Operational Form	Related To	Relationship Found
Beek (1964)	Assembly line workers in an electronic manufacturing plant.	Assembly line inspector's charts showing number of short circuits, assembly faults, and soldering faults per 100 units.	Speed and regularity of worker's pace.	The medium (in speed of working), regular workers had better quality output than irregular, fast or slow workers.
Katzell, Barrett, & Parker (1961)	72 wholesale drug warehouses.	Number of errors in filling orders per 1000 man-hours of work.	Three other effectiveness variables and a statistical factor tapping "urbanization".	Not related to the other effectiveness criteria (quantity, profit, turnover), negatively related to "urbanization".
Parker (1963)	80 warehouses of a pharmaceutical company.	Number of order-pricing errors and number of order-filling errors per 1000 man-hours production.	Situational and leadership measures, other effectiveness measures.	Pricing errors correlated .28 with order-filling errors, and .23 with "initiating structure" of foremen (both $p < .05$). Order-filling errors also correlated .27 with warehouse size, and -.24 with employment security (both $p < .05$).
Seashore, Indik & Georgopoulos (1960)	27 work units in a delivery truck company.	Number of non-deliveries over a one-month period, for individuals. Took mean individual score as the work unit measure.	Four other measures of organizational effectiveness criteria, effectiveness, productivity, chargeable accidents, unexcused absences.	Correlated these at the individual, work unit, & individuals within work units levels of analysis. Significant, negative correlations found between errors and effectiveness, productivity, and accidents at all levels except individuals within units. Absences were significantly positively correlated at two of three levels, (not related at work unit level).
Student (1963)	40 work groups in an appliance manufacturing plant.	A rating of actual vs. anticipated numbers of rejects, taking into account the disposition, amount, and kind of reject.	Five sources of power (French & Ravens sources)	Expert and referent power correlated about .31, and expert and referent power (or incremental influence) correlated .36 with quality. (all r 's significant at .05 level)

Accidents

This variable refers to frequency of on-the-job accidents resulting in lost time and has been infrequently included as a measure of effectiveness. We have only two examples.

Student (1968) used the number of reported injuries for a work group divided by the number of men in the work group as a measure of work group accident rate. Seashore, Indik, and Georgopoulos (1960) working with a delivery van organization, used the simple number of accidents over a two-year period as an individual measure, with the mean of the individuals' scores serving as a work unit measure.

Although the biases usually found in archival accident data are well known, we found no attempt in the organizational effectiveness literature which tried to deal systematically with these biases.

Relationship to Other Variables.

Seashore et al. found a negative relationship between accidents and errors (inverse measure of quality of work) with both the work group and the individual as the unit of analysis. Accidents were not related to effectiveness, productivity, or unexcused absences.

Student found a negative correlation between accidents and the "expert" power of supervisors, but no relationship to four other bases of power.

Summary.

This variable is measured straightforwardly from organization records and appears to have little systematic relationship with other variables, but little research exists here.

Accidents				
Source	Sample	Operational Form	Related To	Relationship Found
Seashore, Indik & Georgopoulos (1960)	Delivery truck organization, 27 work units, 975 individuals	Number of on-the-job accidents for the previous two years, both for individuals and units (unit score = mean of individual scores in the unit).	Four other measures of organization effectiveness criteria of: effectiveness, productivity, unexcused absences, and errors.	For correlations with work units as unit of analysis, accidents correlated significantly negatively with errors (-.65, $p > .05$). With individuals as unit of analysis, the same variables again correlated significantly (-.18, $p > .05$). For individuals within stations, no significant correlations were found.
Student (1968)	486 employees in 40 work groups in appliance manufacturing plant.	Number of reported on-the-job injuries for a work group divided by number of men in the work group. (Work group's unit of analysis).	Measures of five sources of power (French & Raven five sources).	Accidents related negatively to "expert" power. ($r = -.28$, $p > .05$)

Growth

Growth can be defined as an increase in such things as manpower, plant facilities, assets, sales, profits, market share, and innovations. It implies a comparison of an organization's present state with its own past state. Only four articles present measures of growth, but several authors discuss or define this concept (Katz & Kahn, 1966; Kuin, 1968; Likert, 1967; Thompson, 1967).

The Michigan researchers derived statistical factors representing growth. Bowers (1964) presented a factor based on analysis of insurance company records that reflected the growth in dollar volume over the preceding few years, and Seashore and Yuchtman (1967) label a factor "Manpower Growth" defined by variables measuring increases in manpower and the ratio of that increase to total manpower.

Bowers correlated this factor with measures of control (amount of influence in an organization, totally and at each hierarchical level) and an overall effectiveness ranking. No significant correlations were found. Seashore and Yuchtman did not correlate "Manpower Growth" with any other variables, but did examine the stability of scores on this factor over a ten-year period. They found very low stability coefficients (highest was .22).

Wainer and Rubin (1969) used the annual increase in the logarithm of sales volume between years as a measure of growth. They related this measure to measures of the motivation of the organization's president (organizations were small entrepreneurial firms), and found that the motivational measures were related to growth.

Prien and Ronan (1971) derived a statistical factor from analysis of 38 variables of both archival and subjective types that was defined by two variables--a growth index and amount of average growth rate. They did not relate this to any other variables.

Summary.

Growth has, for the most part, been measured by a statistical factor when it has been made operational. It has been found to be unstable over time (at least in insurance agencies) and unrelated to effectiveness or control (again in insurance agencies). In one instance it has been found related to the motivations of chief executives, but this is certainly a tentative finding.

Growth				
Source	Sample	Operational Form	Related To	Relationship Found
Bowers (1964)	40 insurance agencies	Statistical factor based on archival measures, called "Business Growth".	Estimates by agents of "total control", control at four levels of the organization, and an overall effectiveness ranking by company officials.	No significant correlations with any of the control or effectiveness measures.
Seashore & Yuchtman (1967)	75 insurance agencies	Statistical factor based on 76 archival measures.	None. analyzed for stability over an 11-year period.	Low stability, highest correlation among 1952, 1957, 1961 measurements was .22.
Prien & Ronan (1971)	107 small metal-working firms	Statistical factor derived from analysis of 38 variables measuring organizational input and output. Defined by two variables - growth index and amount of average growth rate. Variables entering into the analysis were both archival and subjective in nature.	No attempt made to relate this to other variables.	
Wainer & Rubin (1969)	51 small, "entrepreneurial" firms	Increase in logarithm of sales volume, most recent year - next most recent year.	TAT motivation measures (Firm Presidents), nAch, nAff, nPow.	High nAch and low nAff scores associated with high growth rate, nPow not related.

Absenteeism

Seashore, Indik, and Georgopoulos (1960) point out that this variable is highly important when an organization has a highly coordinated, rigid, daily schedule where absence, especially unanticipated absence, can severely disrupt the work process. In their study of a nationwide delivery truck organization, they used the number of unexcused absences over a two-year period as a measure of individual absenteeism, and the mean of the individual members' scores for a unit score on absenteeism. Student (1968), studying appliance manufacturing plant workers, used the same work group measure, except that he computed two measures, one for excused and one for unexcused absences.

Seashore et al. found absence unrelated to effectiveness or productivity, and negatively related to errors in work. Student found that excused absences were related negatively to two sources of supervisory power (referent and expert power) but were unrelated to the three other sources. Unexcused absences were not related to any of the sources of power.

Summary.

Absenteeism is measured by using organization records, is sometimes split into excused and unexcused absence, and does not seem highly related to other organizational variables. However, little research actually has been done.

Absenteeism				
Source	Sample	Operational Form	Related To	Relationship Found
Seashore, Indik, & Georgopoulos (1960)	Delivery service stations, 27 workgroups, 975 individuals.	Number of unexcused absences for last two years.	Overall effectiveness, Productivity, Accidents, Errors.	Little or no relationship found, highest correlation = $-.18$ ($p < .05$) between errors and absence.
Student (1968)	40 appliance manufacturing plant work groups, 486 employees.	Total number of excused or unexcused absences for a work group, divided by number of members of work group.	Five sources of power (Raven & French).	Excused absences negatively related to referent and expert power.

Turnover

This is usually some measure of the frequency and amount of voluntary terminations and refers to a change in actual personnel within the organization, however that change occurs. All but one of the turnover measures we reviewed are archival, but even with this constraint there are a surprising number of variations.

Grusky (1963, 1964) and Eitzen and Yetman (1972) both used the change in coaches or managers of athletic teams as a measure of turnover, Grusky for major league baseball teams, Eitzen and Yetman for college basketball teams. Both looked at team records over a period of about forty years, and computed the number of coaching or manager changes divided by the total number of years. The analogous activity in the military would be to look at turnover only in the officer corps.

McNeil and Thompson (1971) compute what they call a regeneration rate, which is the change in the ratio of newcomers to veteran members of an organization. Their regeneration index reflects the time elapsing before the ratio of new members to old members reached 1:1 from a certain base period. They illustrated the use of their index on college faculties.

Student (1968) used the number of quits, transfers, and formal bids for jobs in other work groups not involving advancement, all divided by the total number in the work group as a turnover measure. Katzell, Barrett, and Parker (1961) were content to use the additions to a work force per quarter (expressed as a percentage of total number employed) as a turnover measure.

Finally, Bowers (1964) and Bowers and Seashore (1966) derived a factor in their study of the archival records of insurance companies that reflects turnover and they used two components to measure it: terminations + appointments/manpower, and terminations/manpower, both for a one year period. Similarly, Mahoney and Weitzel (1969) found a factor reflecting turnover, but theirs was based on factor analysis of questionnaire ratings, not archival records. They defined their factor as reflecting turnover from inability to do the job.

In examining these measures, it appears that each is getting at a somewhat different facet of this seemingly simple, but actually complex variable. Grusky and Eitzen and Yetman are attempting to measure turnover in highly important, central decision making positions. McNeil and Thompson attempt to get a fix on the rate of change in personnel over

time, Katzell, Barrett, and Parker attempt only to tap additions to the work force, while Student seems to include any and all exits from a work group as well as contemplated exits (that are not promotional) in his turnover measure. Finally, the two factor analytic attempts come up with differing operationalizations.

Relationship to Other Variables.

Turnover has been found unrelated to organizational control (Bowers, 1964), overall effectiveness rankings (Bowers, 1964; Mahoney & Weitzel, 1969), leadership (Bowers & Seashore, 1966) quality, profit, satisfaction, and productivity (Katzell et al., 1961), and four sources of supervisory power (Student, 1968). It has been found negatively related to won-lost records of professional and college sports teams (Grusky, 1963, 1964; Eitzen & Yetman, 1972), and positively related to one source of supervisory power, referent power (Student, 1968).

Turnover				
Source	Sample	Operational Form	Related To	Relationship Found
Bowers (1964)	40 life insurance agencies	Statistical factor derived from 70 archival records, measures changes in staff in terms of acquisition of new men and terminations of older staff.	Estimates by agents of "total control", control at four levels of the organization, and an overall effectiveness ranking by company officials.	No significant correlations with any of the control or effectiveness measures found.
Bowers & Seashore (1966)	40 life insurance agencies	Statistical factor derived from 70 archival records, measures changes in staff in terms of acquisition of new men and terminations of older staff.	Four paper and pencil leadership measures, all taken at two levels (peer and manager).	No correlations significantly different from zero found.
Eitzen & Yetman (1972)	Performance records of 129 college basketball teams for period 1930 - 1970.	Number of years divided by number of coaching changes (average tenure of coaches).	Won - Lost records of the teams over the years (1930 - 1970).	Coaching tenure and won-lost correlated -.24. Further analyses led to conclusion that there were no beneficial short term effects from a coaching change, but there were long-term effects.
Grusky (1963-1964)	Records of major league baseball teams for years 1921-1941, 1951-1958.	Number of managerial changes divided by time period, or average managerial tenure.	Won - Lost records of the teams.	Computed Kendall's tau for the two time periods 1921 - 1941, tau = -.40 (p<.02), 1951 - 1958, tau = -.60 (p<.001).
Katzell, Barrett, & Parker (1961)	72 wholesale drug warehouses in the drug and pharmacy industry.	Additions to work force per quarter, expressed as percentage of total number employed.	Three other effectiveness variables, five situational variables, and scores on a satisfaction questionnaire.	Not related to the other effectiveness variables (quality, profit, quantity), negatively correlated with wage rate, and unrelated to satisfaction.
Mahoney & Weitzel (1969)	283 organizational sub-units across various technological types.	Statistical factor derived from analysis of 114 questionnaire items.	Ratings of overall effectiveness of the sub-units by managers, in a multiple regression equation.	Their turnover factor contributed negligibly to the prediction of overall effectiveness. Was one of 17 factors accounting for two percent of the variance of the overall effectiveness ratings.
McNeil & Thompson (1971)	Faculty at two Southern Universities.	"Regeneration Index", reflecting the time elapsing before the ratio of new members to old reaches 1:1.	Nothing, only illustrative data presented.	

Turnover (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Prien & Ronan (1971)	107 small metal-working firms, interview data.	Statistical factor that purportedly measures "succession"; loading variables were: Chief executive is founder, company has formal personnel program, company age, break even point as a percentage of capacity. Variables entering into analysis were both archival and subjective in nature.	No attempt made to relate to other variables.	
Student (1968)	40 work groups in an appliance manufacturing plant.	Number of quits, transfers, and formal bids for jobs in other work groups (not involving advancement) — divided by total number in the work group.	Five sources of power (French & Ravens sources)	Only referent power was related to turnover. ($r = .23, p < .05$)

Satisfaction

Satisfaction has been defined many ways (e.g., see Wanous & Lawler, 1972) but perhaps the modal view references satisfaction to the achievement or possession of certain outcomes provided by the organization and defines it as an individual's perception of the degree to which he or she has received an equitable amount of the outcome. That is, satisfaction is the degree to which individuals perceive they are equitably rewarded by various aspects of their job situation and the organization to which they belong.

Satisfaction is universally measured by individual self-ratings. Most researchers in the organizational effectiveness literature reviewed here used more than one scale to tap satisfaction. However, Bachman, Smith, and Slesinger (1966) and Meltzer and Salter (1962) used a single scale that asked for a global rating of satisfaction (of the sort, "All in all, how do you feel about your job?", responded to on a five-point Likert scale anchored "very dissatisfied" to "very satisfied").

Guba (1958) used a global rating in addition to ten specific ratings of satisfaction, while several authors (Bowers & Seashore, 1966; Aram, Morgan, & Esbeck, 1971; Bowers, 1964; Box & Cotgrove, 1968; Katzell, Barrett, & Parker, 1961; Rowland & Scott, 1968) have used the multi-facet approach to measuring satisfaction. Generally, the ratings are of the Likert format, though Rowland and Scott used the semantic differential.

In the studies using satisfaction as a measure of organizational effectiveness from 5 to 21 separate items were rated in terms of individual satisfaction. Most of the items can be classified as satisfaction with outcomes in the following categories: the work itself, supervision and management, pay, fringe benefits, fellow workers, promotional and growth opportunities. These measures of satisfaction are usually computed for individuals only, and means used for unit or organization satisfaction scores.

At least two questions arise from all of this. First, is it worthwhile to use a multi-facet measure of satisfaction rather than a single, global rating? Second, does it make good sense to use the mean of individual job satisfaction to represent work group or organization satisfaction?

Relative to the studies that have used satisfaction as an indicator of organizational effectiveness, very little empirical consideration has been given to the first question. Aram et al. (1971) considered the problem, but their consideration was limited to one factor analysis of

16 items which yielded four factors. Taylor and Bowers (1972) included a number of satisfaction items in the Survey of Organizations questionnaires and seven factors are scored. This is perhaps the only instance in the organizational literature where considerable research data were brought to bear.

The second question is really asking whether there is enough variance in individual satisfaction that is attributable to organizational characteristics to make it worthwhile to aggregate individual satisfaction and call the composite a measure of organizational functioning. In the ANOVA sense, a significant portion of the variance must be due to differences between organizations. All of it can't be soaked up by differences between individuals. None of the studies we reviewed considered this question directly. However, we will come back to it again in the section on climate and structure when we consider the possibility of having individuals rate not their own satisfaction but their perception of the overall level of satisfaction in the unit or organization.

These measures of satisfaction which we did find being used in the literature have been related to several other organizational and individual variables. Aram et al. (1971) found their four satisfaction dimensions positively related to three dimensions of work group collaboration and consensus. Rowland and Scott (1968) correlated their nine measures of satisfaction with a set of personality measures but found few significant correlations (only nine of 95 correlations were significant at .05 level). The measures they used were the Leadership Opinion Questionnaire, Role Construct Repertory Test, Barron-Welsh Art Scale, Purdue Adaptability Test, Edwards Personal Preference Schedule, and a modified Navy "upward influence" rating form.

Bowers and Seashore (1966) correlated five satisfaction scales (satisfaction with company, fellow agents, job, income, and manager) with four measures of leadership: support, goal emphasis, work facilitation, and interaction facilitation. These leadership measures were taken for peers and managers. Thus there were 40 correlations in all. Thirty of the 40 were significant at .05 or better, and all significant correlations were positive (ranged from .31 to .78).

Bowers (1964) related control, the ability to exercise influence within an organization, to several facets of satisfaction. He found that total control (the sum of the amount of control for all hierarchical levels in an organization) was generally positively related to job satisfaction. He also found that satisfaction on two of the five facets was positively related to an overall effectiveness ranking.

Box and Cotgrove (1968) found that "dedication to science" interacted with "organizational freedom" to affect satisfaction. Their sample was composed of research scientists.

Bachman et al. (1966) using a global estimate of satisfaction, found that satisfaction correlated significantly ($p < .01$) with 11 other "predictor" variables. Six of these variables tapped the amount of control that office managers and the sales force had over office and individual practices and behavior, while five tapped French and Raven's five power bases.

Guba (1958) found a positive relationship between responses to specific satisfaction items and his morale measurement, but not between a global satisfaction response and morale.

Katzell et al. (1961) found satisfaction positively correlated with quantity of work and profit, but not related to turnover and quality. They also found satisfaction negatively correlated with five situational measures that seemed to reflect the degree of "urbanization" of the area in which the organization was located. (Small-town employees were more satisfied than large city employees.)

Meltzer and Salter (1962) found that members of medium-sized organizations were more satisfied than were members of large or small organizations, while members of organizations with fewer hierarchical levels were more satisfied than members of organizations with more levels.

It appears, then, that satisfaction is related to several organizational variables but not to individual personality variables. Porter & Lawler (1965) have previously reviewed the relationship of job satisfaction to several organizational structure variables and found that satisfaction was generally related to these structure variables. Leadership, work group relations, influence or control, and morale, besides the structure variables, seem to be related to job satisfaction as measured by a self-rating.

One curious and disheartening feature of the "job satisfaction as a measure of organizational effectiveness" literature is that it shows so little recognition of the huge literature on job satisfaction that has been built up in the context of the individual as a unit of analysis. For example, the Job Description Index (Smith, Kendall, & Hulin, 1969) and the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967) are two extremely well researched measures of job satisfaction but they are given scant attention in the "organizational effectiveness" literature.

Satisfaction				
Source	Sample	Operational Form	Related To	Relationship Found
Aram, Morgan, & Esbeck (1971)	Research teams for a rubber manufacturing company. Total N = 140 individuals.	Factor analyzed a 16-item questionnaire, came up with four factors of satisfaction: professionalism, job conditions, status orientation, self-actualization. Only individual scores computed.	Scores on three dimensions of work group collaboration and consensus, these were the individual's perceptions of his team's collaboration.	Almost all correlations between the three dimensions of collaboration scores and the four factors of satisfaction scores were significant at $p < .05$. Range of significant correlations was .25 to .48.
Bachman, Smith & Slesinger (1966)	36 sales offices, mean N in sales office = 18.	One to five Likert response to the item "All things considered, how satisfied are you with the way your office manager is doing his job?" Anchored very dissatisfied to satisfied.	Eleven predictors dealing with control of individual and unit behavior and five power bases.	Satisfaction correlated at a $p < .01$ with every predictor.
Bowers (1964)	40 life insurance agencies	Questionnaire items tapping five areas of satisfaction: company, regional manager, fellow agents, job, income.	Estimates by agents of "total control", control at four levels of the organization, and an overall effectiveness ranking by company officials.	"Total control" correlated significantly positively with all five satisfaction facets ($p < .05$) overall effectiveness ranking correlated significantly positively with two of five facets (regional manager and fellow agents). Ten of twenty correlations between the satisfaction facets, and control at the four organizational levels were significant positive. All but one were positive of the insignificant r's.
Bowers & Seashore (1966)	40 life insurance agencies	Questionnaire items tapping five areas of satisfaction: company, regional manager, fellow agents, job income.	Four paper and pencil leadership measures: support, goal emphasis, work facilitation, inter-action facilitation, taken at peer level and manager level.	Satisfaction with fellow agents, income, and manager was generally positively correlated to the four leadership measures at both peer and manager level. (range from .31 to .86). Satisfaction with job and company was significantly, positively correlated in only seven of the 16 correlations with the leadership measures, (range from .31 to .39).
Box & Cotgrove (1968)	Eight research laboratories in chemical and pharmaceutical industries.	Response to 21 items concerning job conditions on a 5-point Likert scale.	Measures of "organizational freedom" and "dedication to science".	Interactive relationship of "freedom" and "dedication" to satisfaction (high on "dedication", low on "freedom", more likely to be dissatisfied).

Satisfaction (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Guba (1958)	11 high schools in suburban area of Midwest metropolis. N=168 teachers.	Ratings of satisfaction with ten specific items plus one global rating of satisfaction.	Scores on a specially developed morale instrument, the Teacher Behavior Rating Scale.	Those who scored higher on the specific satisfaction items also tended to score higher on the morale instrument, but no difference found for the global satisfaction rating.
Katzell, Barrett, & Parker (1961)	72 wholesale warehouses in the drug and pharmacy industry.	Questionnaire ratings on 10 aspects of the job, of the usual sort: nature of job, pay, benefits, supervision, etc. 47 items total.	Measures of quantity, quality of performance, profit, product-value productivity, turnover and five situational measures: work force size, city size, wages unionization and percent male.	Satisfaction was, overall, positively correlated with quantity and profit, and not related to turnover or quality. Satisfaction was negatively correlated with all five situational measures. This meant, conclude the authors, that small town employees were more satisfied.
Meltzer & Salter (1962)	Nationwide survey of physiologists. N=786.	Response on a 5-point Likert scale to, "All in all, how do you feel about your present job?"	Organizational variables, of size and number of levels, and several attitudinal and situational variables.	Persons in medium-sized organizations or organizations with few levels were more satisfied than others. The six other variables were also significantly related to level of satisfaction. (Chi-square test)
Rowland & Scott (1968)	58 first-line supervisors, 673 subordinates, at a naval ammunition depot.	Responses to semantic differential scales concerned with nine different aspects of the job. (Worker himself, supervisor, two scales), job, pay, benefits, fellow workers, growth opportunities, working conditions.	Several measures of the group supervisors. LOQ scores, ratings of supervisor on seven scales of "upward influence" by his superiors, measures of cognitive complexity, intelligence and needs. (Role Construct Repertory Test, Barron-Welsh Art Scale, Purdue Adaptability Test, Edwards Personal Preference Schedule)	Out of 95 correlations between work group satisfaction scores and these leader attributes, nine were significant at the .05 level. Seven of these were correlations with the worker's perception of the degree of success of their supervisor (one of the two supervisor satisfaction scales).

Motivation

In our present context this is the strength of the predisposition of an individual to engage in goal-directed action or activity on the job. It is not a feeling of relative contentment with various job outcomes as is satisfaction, but more akin to a feeling of readiness or willingness to work at accomplishing the job's goals.

There are few efforts to measure motivation in the organizational effectiveness literature. Parker (1965) derived a cluster (the method used is not described) from data on 80 warehouses that he called "work motivation." He describes this cluster as being made up of measures of high productivity, worker beliefs that good work leads to job security, and supervisory recognition. This was an apparent attempt to measure an entire organization's work motivation, and not an individual's motivation level.

Another such effort was Rosen's (1970) attempt to measure what he called "money motivation," or the motivation of a work group to work as a result of incentive wages. His sample consisted of workers in a furniture factory. Their "money motivation" score was the difference between the preference ratings (on a one to seven scale) of the most preferred and least preferred product line relative to the opportunity for making money when working on that line. Rosen interpreted a large difference as showing a high preference for profitable products and thus high "money motivation," while a low difference indicated little concern for possible earnings and thus low money motivation. Rosen correlated this measure with other organizational measures over a period of several weeks before and several times after a short notice shifting of foremen among the work groups. The correlation of "money motivation" with performance increased (from .03 to .75 after 16 weeks) after the shifting of foremen. However, Rosen's study used a very small N (seven work groups) and had no control groups. Consequently, his results must be viewed as tentative. Still, his study is one of the few that actually manipulated an important independent variable in a real organizational setting.

Finally, Wainer and Rubin (1969) analyzed the Thematic Apperception Test (McClelland, Atkinson, Clark, & Lowell, 1953) responses of 51 presidents of small entrepreneurial firms. They scored the responses on nAch, nAff, and nPow and related the scores to a measure of the organization's growth. Briefly, they found that nAch was positively, nonlinearly related to growth while nAff was negatively, nonlinearly related to growth. nPow scores were not related to growth.

Thus cluster analysis, difference scores on Likert ratings, and TAT responses have been used to measure motivation in the organizational effectiveness literature. The measures have been found to be related to performance and growth, but certainly no clear pattern or process of the effect on or relation of motivation to organizational effectiveness has emerged.

Motivation				
Source	Sample	Operational Form	Related To	Relationship Found
Parker (1965)	80 work groups in a decentralized warehousing company.	Factor (or cluster) analysis of 80 variables, this is one factor — defined by measures of high productivity, worker beliefs that good work leads to job security, supervisory recognition.	No attempt made to relate this to any other variables.	
Rosen (1970)	Seven work groups in a furniture factory.	Difference between two 1-7 point Likert ratings. Most-preferred — Least-preferred product line, in terms of money-making opportunity.	Correlated with work group performance before and after an experimental manipulation — shifting foremen on short notice.	Following r's found of money-motivation and performance. Before manipulation .03, immediately after .33, 10 weeks after, .33, and .75 after 16 weeks.
Wainer & Rubin (1969)	51 small entrepreneurial firms.	TAT responses of the firms, presidents, interpreted for nAch, nAff, nPow scores.	Growth rates of firms over last two years, log (year - 1) — log (year - 2).	nAch curvilinear positive, nAff curvilinear negative, nPow not related. Pattern analysis also reported, but n's exceedingly small.

Morale

This is an often used variable that is difficult to define or even to understand how organizational theorists and researchers are using it. The modal definition seems to view morale as a predisposition in organization members to put forth extra effort in achieving organizational goals and objectives. It includes feelings of commitment and is a group phenomena involving extra effort, goal communality, and feelings of belonging. Groups have some degree of morale while individuals have some degree of motivation (and satisfaction). By implication, morale is inferred from group phenomena.

Most measures of morale are ratings, usually obtained from individuals. Beek (1964), Kavcic, Rus, and Tannenbaum (1971) and Georgopoulos and Tannenbaum (1957) all use individual ratings, usually in a Likert format. However, in some cases their scales could just as easily be construed as measuring satisfaction. Beek's items ask such questions as, "I like doing my job," "I work in a nice department," and "My work is too tiring." When morale scores are wanted for a unit, the mean of the individual ratings is usually taken to represent the unit's morale score.

Georgopoulos and Tannenbaum (1957), Hage (1965), and Price (1967) all suggest or use turnover as a measure of an organization's morale. In addition, Price uses absenteeism as an indicator of morale in his review. These measures may indicate morale indirectly, but there are several other factors that could conceivably influence turnover and absenteeism besides morale. March and Simon (1958) offer a potential list. Furthermore, though turnover rate is computed for a whole organization, the actual decision to leave an organization is an individual one. Thus turnover probably better reflects individual phenomena such as satisfaction and motivation, than it does morale, a group phenomena.

Guba's (1958) measure of morale appears to be the best one in the literature surveyed. He constructed a measure of morale by first identifying organizations with high and low morale (superintendents of school districts nominated high and low morale schools), then interviewing members of those organizations, and, finally, using the analysis of these interviews to construct a questionnaire instrument to measure morale. He then administered the instrument to all the teachers in the schools, and deleted items that did not differentiate the high morale from the low morale schools. This approach, at least, if not his instrument, seems a worthwhile one. However, as with any other empirically keyed instrument, the development of a "theory of morale" would not be greatly aided using this approach unless care was taken to build in a theoretical structure in the instrument.

Relationship to Other Variables.

Beek (1964) found, in his study of assembly line workers, that workers on small assembly lines with more opportunity for social interaction had higher morale than workers on longer lines with less opportunity for interactions.

Guba (1958) found that those teachers who scored in the upper quartile on his morale instrument did not differ on a social desirability scale, but did show more confidence in their principal, feel more effective in specific teaching areas, and felt more satisfied.

Kavcic et al. (1971) confirmed their hypothesis that organizations with more participatory styles of management would have higher morale.

Summary.

Little work has been done, aside from Guba's, on building an instrument to tap morale. And Guba's approach is still basically that of using the mean of individual scores to get a group or organization score. The small amount of research done seems to show that the structure of the work situation, satisfaction with work, perceived effectiveness in one's work, and the character of relationships with superiors are all related to morale.

Morale				
Source	Sample	Operational Form	Related To	Relationship Found
Beck (1964)	Assembly line workers, N=266. In an electronics plant in the Netherlands.	Individuals on assembly lines answered questionnaire items asking such things as "I like doing my job", "I work in a nice department", "My work is too tiring", etc. Appears to tap individual satisfaction more than morale. Used percentage of favorable responses of entire assembly line as the score.	Type of assembly line. Compared scores for three different types of lines, varying in size (number of people on line) and opportunity for social interaction.	Smaller lines with more opportunity for social interaction had the highest morale, which was longer, with less opportunity for interaction, but had some alterations from a "regular" line, the "regular" line being lowest in morale.
Guba (1958)	11 secondary schools in suburban Chicago area. 168 teachers participated.	Empirically keyed questionnaire with items developed from interviews with 40 teachers in schools nominated as having high and low morale by superintendents. Called the Teacher Behavior Rating Scale.	Scores on a questionnaire tapping satisfaction, effectiveness (of the individual teacher), and confidence in the school principal. Also a measure of conformity of responses (social desirability).	Scores in the upper and lower quartile of the morale instrument did not differ on the conformity scale, but the uppers did show more confidence in the principal, and feel more effective in specific teaching areas, and feel more satisfied.
Kavcic, Rus, & Tannenbaum (1971)	Four industrial plants in Yugoslavia. N ranged from 650 - 1995 in the plants. They manufactured rubber, shoes, and wood products (2).	10 questionnaire items responded to on a 5 point Likert scale, measuring job motivation and involvement in the organization, with figures given for the plant as a whole. (Percent responding above median was the plant's score.)	Authors predicted that plants with participatory styles of management would have higher "morale" scores or job motivation and involvement for plant as a whole.	Results tend to support the hypothesis, but N is small and authors point out several alternative explanations.

Control

Control refers to the degree of, and distribution of management type control that exists within an organization for influencing and directing the behavior of organization members.

The Control Graph.

There does exist a clearly articulated instrument for the measurement of control. It is the "control graph," originated by Tannenbaum (1961, 1962) and the research concerning this instrument has been collected and reviewed in Tannenbaum (1968). Readers are referred to this volume for extensive treatment of control as these researchers have conceptualized and measured it. We will treat only a part of their research here.

The data for constructing a control graph is obtained from a questionnaire containing items like: "In general, how much influence (pull, say, etc.) do each of the following have about things (e.g., operations, behavior, sales, innovation, etc.) around here?" This is followed by a list of the various hierarchical levels (workers, supervisors, managers, etc.) with Likert scales for the subject's responses. Using these data, a graph is constructed which has hierarchical levels along the abscissa ratings of amount of control exercised by the various levels along the ordinate. Various hypotheses about the relationship of the height and shape of the curve to such things as organizational effectiveness ratings or production records can be made and tested.

A number of studies have related this measure of control, or some variant of it, to several other variables such as: organizational effectiveness ratings (Georgopoulos, 1965; Bowers, 1964), archival productivity data (Bachman et al., 1966; Georgopoulos, 1965; Smith & Ari, 1963, 1964), factor analytically derived factors of organizational performance (Bowers, 1964), morale (Smith & Ari, 1963, 1964), satisfaction (Bachman et al., 1966; Bowers, 1964), and organizational size, organizational level, and work group size (Baum et al., 1969).

Generally, total control (the sum of the amounts of control at each hierarchical level in the organization) has been found positively related to effectiveness, productivity, morale, and satisfaction. The degree of positive slope of the control graph (degree of democratic supervision) has been related to fewer variables and has found much less support. Concerning this aspect of control, Tannenbaum (1968) concludes that concern with power differentials between organizational ranks and the subsequent concern with attempts to equalize power across ranks are perhaps misplaced, and such concern would be better directed toward maximizing total control.

Laboratory Measurement of Control.

Levine and Katzell (1971) conducted a small laboratory study in which they manipulated amount of control and distribution of control, relating these to measures of performance and satisfaction. The lab groups contained only three members each and only two levels of the "control" variables were used. Keeping these criticisms in mind, Levine and Katzell still found the amount of control and, to a lesser extent, distribution of control, to be "potent influences" on their performance and satisfaction measures. They also found interaction effects suggesting that a higher amount of control and a balanced distribution of control seemed most conducive to better performance on difficult tasks.

Basis of Control.

A different kind of research has focused on a possible basis of control or influence. Several authors have taken French and Raven's (1968) five power bases as a research tool for investigating the sources of supervisory control. The operational measure is usually a Likert scale response to an item asking a subject about the importance of a specific power base for his compliance with a supervisor's requests. Thus five scores, one for each power base (expert, referent, coercive, reward, and legitimate) and occasionally a sixth are usually obtained (Bachman, Smith, & Slesinger, 1966). The sixth score is called "incremental influence" and is the sum of expert and referent power scores. This score is thought to represent the power residing in the person occupying the organizational role, which is over and above the power inherent in the organizational role itself (Ivancevich & Donnelly, 1970; Student, 1968).

These five or six scores have been correlated with several measures of organizational performance and effectiveness, satisfaction, turnover, absence, etc. Generally, referent and expert power seem positively related to performance, effectiveness, and satisfaction; and negatively related to turnover and absence, though the evidence is far from conclusive (Bachman et al., Ivancevich & Donnelly, Student). Coercive and legitimate power seem less strongly related to other organizational phenomena.

Finally, Friedlander (1966) derived a statistical factor he called "leader control" in his study of 91 members of a government research and development organization. This factor describes the extent to which a work group leader initiates and controls the work group process, primarily through domination of the communication system. He did not relate this factor to any other variables.

Summary.

Most of the work on control has been carried out in a programmatic effort by the Michigan researchers, briefly outlined and summarized above. Since it has some history of research and has exhibited fairly stable results, the control graph appears to be a potentially useful instrument.

The work on the power bases of control is less extensive. However, it might be fruitful in future research to combine the methods used to measure these power bases with the control graph (Bachman et al. did this already to some extent). Such research might begin to shed light on the processes involved in the exercise of control in organizations.

Control				
Source	Sample	Operational Form	Related To	Relationship Found
Bachman, Smith, & Slesinger (1966)	36 sales offices, mean N in office = 18.	Subjects rank ordered five "bases of power" (expert, referent, coercive, reward, legitimate) regarding their importance as a reason for complying with manager.	Standardized scores of dollar productivity for the office (equated for experience level), and an overall rating of satisfaction with the way the manager does his job.	All five power bases correlated significantly with satisfaction scores, referent and expert power positively, the other three negatively. (r's were from .51 to .75, absolute value). Only referent, expert, and reward power correlated significantly with productivity, .40, .36, and .55 respectively. Note, however, that the power base scores are based on rankings and thus the negative correlations may be artifacts, (due to nature of rankings).
Bachman, Smith, & Slesinger (1966)	36 sales offices, mean N in office = 18.	Salesmen rated "managerial" and "sales force" influence over individual sales behavior and office practices, each on a 1 - 5 Likert scale. The ratings were summed for a "total control" measure.	Standardized scores of dollar productivity for the office (equated for experience level), and an overall rating of satisfaction with the way the manager does his job.	All correlations were significant at .05 level except for managerial control over office correlated with office productivity. "Total control" correlated higher with productivity and satisfaction than did either of the managerial or sales force control scores. r's ranged from .35 to .88.
Baum, Sorenson, & Place (1964)	branch offices of an insurance company.	The "control graph". Subjects indicate the amount of influence or control exercised by organizational members of each hierarchical level. Scores for total control, and judgements about distribution of control across organizational levels can be obtained from this basic data. Authors here use the data to obtain "percentage agreement" scores concerning perceptions of organizational control (by three levels of the organization, management, non-supervisory management, and clerical).	Organization size and organizational level.	Percent agreement on control between the three levels of the organizations was highest for medium size organizations and lower for small and large organizations. Agreement on the control exercised at each level is greatest for the lower and upper levels, less agreement on control exercised by middle levels. Finally, management and clerical levels had the least agreement on perceptions of control, while the two management levels had highest agreement.

Control (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Bowers (1964)	40 life insurance agencies	The "control graph". See Baum, Sorenson & Place. Used a "total control" score, and control scores for four different organizational levels.	An overall effectiveness ranking, seven statistical factors of organizational performance, and measures of satisfaction in five areas.	Effectiveness ranking: Total control was higher in the top 20 agencies than in the bottom 20 agencies, and control at one of the four organizational levels correlated significantly with effectiveness (.59, $p < .001$). Satisfaction: Total control correlated significantly positively ($p < .05$) with all five satisfaction facets, and 10 of 20 correlations between the five facets and four organizational level control scores were significantly positive. Seven factors: Total control correlated significantly with two of seven factors (-.32 with Agency Development and -.55 with Business Costs), six of 28 correlations between the seven factors and four organizational level control scores were significant at .05. Three of these were for the home office level, and one each at the other three levels. The factor of business costs correlated significantly negatively with control at three of the four levels. No other factor correlated at more than one level.
Friedlander (1966)	91 members of a government research and development organization from three hierarchical levels, 12 groups.	Statistical factor defined by five questionnaire items. Describes the extent to which the leader initiates and controls the group, primarily through domination of the communication system. Called "Leader Control", accounted for 3.3 percent variance, KR-20 = .55, test-retest r (six months) = .51.	Nothing.	
Georgopoulos (1965)	32 stations of a retail merchandise delivery organization.	A measure called "Normative Member Activeness", tapped by a single questionnaire item asking how much influence, in general, the station manager, other supervisors, or the men have on what goes in the station. Responded to on a 1 - 5 Likert scale.	Average worker productivity (for each station) and an average overall performance rating.	Normative Member Activeness correlated significantly with these two measures .52 and .49, ($p < .01$), respectively.

Control (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Ivancevich & Donnelly (1970)	31 sales branches of a marketing organization (number of individuals = 394, branch was unit of analysis)	Likert ratings of the five power bases (see Bachman, et al. above) plus "incremental influence", the sum of the expert and referent power base ratings. Subjects rated their leaders on these power bases.	Eight unit performance measures almost all of an archival nature. (Market potential ratio, size of orders, efficiency rating, costs, route density, excused and unexcused absences, and turnover)	Correlated with the six "power" scores with the eight performance measures, 15 of 48 were significant at .05 level. One for reward, three for expert power, five for referent power, and six for "incremental influence". Coercive and legitimate power had no significant correlations with the performance measures.
Kavcic, Rus & Tannenbaum (1971)	Four Yugoslovian manufacturing plants.	The control graph for "actual" and "ideal" control.	Overall effectiveness ratings of the four plants.	Perfect rank order correlation between total control and the effectiveness ratings of the four plants.
Lawrence & Lorsch (1967)	216 managers, scientists, and engineers in six organizations.	Subjects responded on a 5-point Likert scale to this question: "How much influence or say do you feel each of the levels listed below has on product - innovative decisions?"	The amount of knowledge required to make decisions about products (at each level).	No statistics or scores presented, authors verbally review the extent to which the levels where influence was concentrated were also the levels with the required knowledge. Conclude that organizations high on "integration" met this state of affairs most fully.
Levine & Katzell (1971)	Four three-person groups competing in a laboratory simulation.	Amount of control and distribution of control were set at two levels each by the experimental manipulations.	Performance and satisfaction measures relevant to the laboratory task.	ANOVA showed significant main effects on performance and satisfaction for both amount and distribution of control. Interaction effects suggested that a higher amount of control with a balanced distribution seemed more conducive to higher performance.
Smith & Ari (1963-1964)	32 stations of a nationwide retail delivery organization.	The "control graph", See Baum, et al. above. Here the authors looked at total control and degree of democratic supervision (as revealed by the shape or slope of the control graph). (Total control and slope correlated -.67, so partial correlations with other variables were calculated for these two variables.)	Average productivity data, station "morale" and normative consensus measures.	Morale was significantly positively correlated with both total control and degree of democratic supervision, while productivity was so related with total control, but insignificantly correlated with democratic supervision. General consensus was positively correlated with total control, not related to democratic supervision.

Control (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Student (1968)	468 hourly employees in 40 work groups of an appliance manufacturing plant. Work group is unit of analysis.	Measured the five power bases (see Bachman, et al. above) and "Incremental Influence" (Ivancevich & Donnelly, above) by a single rating for each power base. Workers rated extent to which they complied with their supervisor because of this power base.	Accidents, absences, turnover, several cost measures, performance against schedule, quality and suggestions submitted.	Interrelated five power base measures and incremental influence, all r's were positive, 10 of 15 significant at .05 or smaller probability level. Only expert power significantly related to accidents (-.28, $p < .05$). Referent, expert power and incremental influence correlated significantly negatively with excused absences, all other correlations between power bases and excused absences, unexcused absences, and turnovers were insignificant. Fourteen of 48 correlations between the power bases and the remaining performance measures (refer to previous column) were significant. Incremental influence and referent power each had four (of six total) significant correlations; expert, reward, and coercive power each had two significant correlations (again out of six). Legitimate power was not significantly correlated with any of the performance measures.
Tannebaum (1961-1962)	Stratified random sample of 104 (out of 1000) League of Women's Voters units.	The "control graph". See Baum, et al above. Used "Total Control" scores and measure of democratic control (positive slope of his graph). Total control and degree of positive slope correlated .14.	Organizational effectiveness, as measured by expert ratings (29 percents at national headquarters rated each organization on a scale of 0 - 100, ratings averaged), and by percent of questionnaires returned before followup (two measures correlate .33).	Partial correlations (organization size partialled out) of total control and degree of democratic control with effectiveness were .29 and .31, respectively. Partial correlations with the rate of return measure was .23 (positive slope, $p < .005$) and .10 (total control, $p < .15$).

Conflict/Cohesion

This appears to be a bipolar dimension defined at the cohesion end by an organization in which the members like one another, work well together, communicate fully and openly, and coordinate their work efforts. At the other end lies the organization with verbal and physical clashes, poor coordination, and ineffective communication.

Most methods of measuring this variable are subjective. Cohesion is usually assessed by some form of social attractiveness rating, while the methods of measuring conflict have been more varied. There even was one attempt to measure conflict with archival records.

Sociometric Techniques. Lodahl and Porter (1961), studying airline shop workers, measured the cohesiveness of a work group by having the men within a work group write down the names of other work group members with whom they would prefer to work. Using this data they computed a reciprocal choice index (a reciprocal choice being the case when A chooses B and B chooses A). This index was RC/RC_{max} where $RC_{max} = nk + 2$, where n = number in the group and k = number of choices allowed for each group member. The higher the index, the more cohesive the group. Lodahl and Porter found scores on this index unrelated to a measure of group productivity, except in groups which had a technical necessity for working with other groups. They also related the index to means and standard deviations on the Supervisory Ability and Decision Making Ability scales of Ghiselli's Self-Description Inventory (Ghiselli, 1971), finding only a negative correlation between cohesion and the standard deviation of the Supervisory Ability scale.

Marcus (1962) employed a similar index. In his study, social case workers were asked to name their five best friends in the office. By determining the proportion of such choices made for workers within their own units, Marcus could then dichotomize units as high or low on cohesion. Marcus found that more cohesive groups were less productive. Sherif (1957, 1958), in his study of pre-pubescent boys at summer camp also employed a sociometric choice questionnaire, but used it to measure the amount of conflict between members of different groups, rather than within group cohesion. He found that intergroup conflict decreased after "superordinate" goals (an attractive goal achievable only by cooperation of two groups) were imposed on conflicting groups.

Rosen (1970) had furniture factor workers rate the desirability or attractiveness of entire work groups, rather than nominating individuals. The workers rated seven groups and each work group's cohesion score was the mean desirability score assigned it by its

members. Rosen found that cohesion correlated positively with group productivity before ($r = .69$) and several weeks after a short-notice shifting around of the work group's foremen ($r = .47$), but correlated zero immediately after the shift (note $N = 7$, however).

Observation.

Both Sherif and Marcus also used independent observation of groups to assess cohesion. Sherif used observation primarily to identify naturally occurring groups while Marcus actually charted the number of times workers spoke to each other during a 24-hour period. Marcus reports that this method gave similar results to those found using the sociometric choice technique (described above).

Questionnaires. Hastings and Hinings (1970) used questionnaire items designed to tap the professional values of accountants in England in an attempt to measure "professional/bureaucrat conflict." They compared the responses on six dimensions in an attempt to locate differences between accountants in industry and those not in industry. All six dimensions yielded a coefficient alpha over .70. Generally, for accountants in industry, they found lessened commitment to professional values which supposedly implies greater conflict for that group.

Fullan (1970) used a mailed questionnaire to measure "worker integration" for a large sample (1491) of Canadian industrial workers. His sample included workers in the printing, automobile, and oil industries. The questionnaire attempted to tap the extent to which the workers perceived themselves as isolated versus linked together through interaction in five different areas: fellow worker relationships, first-line supervisor relationships, labor-management relationships, status structure, and company evaluation. He then compared the three industries on "integration" scores for the five areas. Generally, he found refinery workers most integrated, auto workers the least, and printers in between. His "integration" approximates cohesion, especially for fellow workers and first-line supervisor relationships.

Both Lawrence and Lorsch (1967) and Burke (1970) used a unique method to measure the way groups resolve conflict. They presented 25 aphorisms (examples are "Might overcomes right," "Soft hands win hard hearts") to their subjects (managers in both cases). The managers then indicated the extent to which a particular phrase represented a typical way of handling conflict in their organization (Lawrence & Lorsch) or the way he himself or his superior typically handled conflict (Burke). They responded on a five-point scale

anchored from "very typical behavior" to "behavior which never occurs." Lawrence and Lorsch factor analyzed their data, derived three factors, and used scores on these three factors to represent a group's mode of conflict resolution. Their data are claimed to support confrontation as the most effective mode of resolving conflict; but Burke failed to replicate this finding (due to effectiveness criterion problems). Burke also found that another mode of conflict resolution, "smoothing over," was related to an individual's perception of having good and constructive experiences with conflict.

Factor Analysis of Questionnaire Data.

Aside from Lawrence and Lorsch's effort, Friedlander (1966) and Mahoney and Weitzel (1969) used factor analysis of questionnaire data and found factors that seemed to measure various aspects of conflict/cohesion. Friedlander analyzed 70 items designed to tap interactional dimensions of work groups. His sample consisted of 91 members of a government research organization, from three different hierarchical levels. Two factors seem relevant for measuring conflict/cohesion: "intragroup trust vs. intragroup competitiveness," defined at one end by groups in which the members have trust and confidence in each other and defined at the other end by a collection of individuals reluctant to sacrifice their individual personal opinions and ideas for the sake of a working consensus; and "submission to vs. rebellion against leaders," groups at the positive end of this factor tend to submit to the leader while groups at the other end are inclined to rebellion. Both these factors had five items as their definers.

Mahoney and Weitzel's factor analysis of 114 effectiveness variables across 283 suborganizational units yielded three factors that seem relevant here. Their names and the authors' descriptions are: (1) cohesion, defined as the degree of complaints and grievances, conflict among cliques within the organization; (2) conflict, defined as the degree of conflict with other organization units about authority or failure to meet responsibilities; and, (3) coordination, defined as the degree to which a unit coordinates and schedules activities with other organizations, utilizes staff assistance.

Archival Records.

Britt and Gulle (1972) attempted to measure industrial conflict by using archival data. They wanted to measure three different dimensions of conflict--proneness to conflict, extensiveness of conflict, and intensity of conflict. To do this they used different combinations of the following four scores: WKRS = number of workers

employed; WS = number of work stoppages from strikes, walkouts, and lockouts; WI = number of workers involved in work stops; and MDI = number of man-days idle from work stops. Using these basic measures, they derived:

$$\begin{aligned} \text{volume of conflict} &= (\text{MDI} \div \text{SKRS}) 100 \\ \text{proneness to conflict} &= \text{WS} \\ \text{extensiveness of conflict} &= (\text{WI} \div \text{WS} \div \text{WKRS}) (1000) \\ \text{intensity of conflict} &= \text{MDI} \div \text{WI} \end{aligned}$$

Summary.

A number of different populations have been measured in a number of different ways in an attempt to operationalize conflict/cohesion. It appears that sociometric choice techniques are most popular for within group cohesion measures, while questionnaire responses are used to tap larger populations across organizations. On occasion the questionnaires are subjected to factor analysis in an attempt to simplify matters.

These measures are not converging on a single concept of conflict/cohesion by any means. At least three trends exist: one is the measurement of small group cohesion in the form of liking one another, liking to work together, etc.; another is the attempt to look at possible conflict across organizational hierarchical levels and organizational types; and the last an attempt to isolate ways of resolving conflict between groups.

Conflict - Cohesion				
Source	Sample	Operational Form	Related To	Relationship Found
Britt & Galle (1972)	Archival data published in various Federal publications on industrial type, unionization, and work stoppages.	Several formulas making use of archival records of number of workers employed, number of work stoppages, number of workers involved in work stoppages and number of days idle from work stops.	Industry type, average union size, and degree of unionization.	Relations to industry type done primarily for illustration, average union size was positively correlated with two of the four formula scores, degree of unionization was positively correlated with all four. Path analysis also was attempted.
Burke (1970)	74 managers employed in the engineering department of a large corporation.	Used responses to 25 aphorisms by the managers to measure the way the managers and their superiors resolved conflict in the organization.	Criterion measure was ineffective so no relationships to effectiveness reported.	
Friedlander (1966)	91 members of a government research organization, from three organizational levels, 12 groups.	Statistical factor derived from analysis of 70 questionnaire items. Called "submission to vs. rebellion against leader". KR - 20 = .52 and test-retest $r = .50$ (6 months).	No attempt made to relate this to any other variables.	
Friedlander (1966)	91 members of a government research organization, from three organizational levels, 12 groups.	Statistical factor derived from analysis of 70 questionnaire items. Called "Intragroup trust vs. Intragroup competitiveness." KR - 20 = .73 and test-retest $r = .68$ (six months).	Correlated group mean factor scores with four demographic variables: age, tenure, occupational and educational levels, as well as group size and group hierarchical level.	Negatively correlated with educational level, group size, and group hierarchical level. Thus large groups high in the organization with more educated members saw themselves as more competitive.
Fullan (1970)	Questionnaire survey of workers in oil refinery, auto manufacturing and printing industries in Canada.	Responses to items that asked the extent to which the subject perceived himself as isolated or linked together through interaction, in five areas: relation to fellow workers, to first-line supervisors, labor-management relationships, status structure, and evaluation of the company. Called this degree of "Worker Integration".	Type of industry or technology (see sample column).	Generally, the refinery workers were most integrated, auto workers least integrated, and the printers scored between those two groups. χ^2 for technology type and the five areas of integration scores were all significant $p < .001$.

Conflict — Cohesion (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Hastings & Hinings (1970)	Questionnaire survey of professional accountants in England.	Questionnaire items tapping six dimensions of professional values for accountants in England. These scores used to assess degree of conflict of professional - bureaucrat roles.	Situational role of the accountant (whether he worked "in industry" or not, those in industry should have more conflict.)	Accountants "in industry" showed less commitment to professional values on four of the six dimensions. More refined tests within the "in industry" sample were also made.
Lawrence & Lorsch (1967)	216 managers, engineers, and scientists in six organizations, operating in the chemical industry.	Subjects responded on a 5 point scale indicating the degree to which each of 25 aphorisms described typical ways of handling conflict in their organization. Factor analysis yielded three factors and factor scores were the measures used.	Ranking of the organizations on profit measures, by orthogonal mean comparisons.	The more effective (profit-wise) organizations used the confrontation mode of handling conflict more often than the less effective organizations.
Lodahl & Porter (1961)	62 work groups at a maintenance base of an airline. (N = approximately nine per group)	Subjects wrote down the names of the men in their group with whom they preferred to work. Using this, authors computed an index reflecting the reciprocal choices (A choose B, B choose A) made by a work group. The higher the index, the higher the cohesion.	A group productivity measure reflecting the extent to which groups achieved time standards set for their work, as well as scores on two scales of Ghiselli's Self-Description Inventory (completed by all group members).	Cohesion scores were unrelated to Productivity, except in groups where there was a technical necessity for cooperation with other work groups (correlation data). The standard deviation of the Supervisory Abilities SDI scale scores were significantly negatively correlated with cohesion (-.28, $p < .05$). Authors concluded that no simple explanation accounted for the results.
Mahoney & Weitzel (1969)	Questionnaire survey of personnel in 283 organizational sub-units, organizations were of various types.	Statistical factors derived from analysis of responses to the questionnaire items (which were drawn from a review of previous literature of organizational effectiveness). Three factors seem to reflect conflict-cohesion, they were "cohesion", "conflict", and "coordinateness".	A single rating of the units overall effectiveness by a superior of the unit's supervisor, in a multiple regression equation with 21 other factors.	These factors did not appear in the set of seven factors that accounted for all but two percent of the variance of the rating predicted by the regression equation. That is, they contributed hardly anything to the prediction of effectiveness (across organization types).
Marcus (1962)	12 work groups in an urban department of welfare, five caseworkers and a supervisor per group.	Workers were asked to name their five best friends in the office, units dichotomized on proportion of these choices made within their own units. Some units were charted for number of times workers spoke with one another. Both methods gave similar results.	Orientation of supervisors ("group" or "procedure" oriented) and productivity of group (proportion of visits made by workers to clients' homes.)	More cohesive units were less productive, groups with "group-oriented" supervisors were less cohesive. Author reports no quantitative data, only conclusions.

Conflict - Cohesion (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Rosen (1970)	Seven work groups in a furniture factory (eight-ten members).	Work group members ranked the desirability or attractiveness of all seven work groups, cohesion score for a work group was the mean ranking of a group by its members.	Several measures: productivity, foremen preference, group consensus on foremen preference, group money-motivation, and management pressure.	Correlations computed before and after an experimental manipulation (short notice shifting of group foremen). Generally, low intercorrelations of variables immediately after manipulation, gradually increasing to the high levels found before manipulation cohesion originally correlated .69 with group productivity, dropped to zero after the shift, and rose to .47 after 11 weeks.
Sherif (1957 - 1958)	Pre-pubescent boys at a summer camp, as found in naturally occurring groups.	Used sociometric choice questionnaires and observation to determine inter-group conflict, adjective check lists on in-and-out-of group persons.	The imposition of a superordinate goal - a goal that is very attractive but achievable only if the groups cooperate.	After such goals were invoked and the groups achieved them, conflict between the two groups decreased. (Increased contact alone did not account for the decreased conflict.)

Flexibility/Adaptation
(Adaptation/Innovation)

This variable refers to the ability of an organization to change its standard operating procedures in response to environmental changes. Many authors have written about this dimension (Benedict, Calder, Callahan, & Hornstein, 1967; Burns, 1961; Gomson, 1968; Hall, 1972; Henry, 1968; Humber, 1960; Utterback, 1971; Indik, 1970; Bennis, 1971; Price, 1967; Korman, 1971), but relatively few have made attempts to measure it.

Mahoney and Weitzel (1969) and Aiken and Hage (1971) both appeared to converge on the measurement of similar concepts. Mahoney and Weitzel, factor analyzing questionnaire responses, derived two factors called "flexibility," or willingness to try out new ideas and suggestions, readiness to tackle unusual problems; and "initiation," defined as initiation of improvements in work methods and operations. These factors seem to tap something similar to Aiken and Hage's measure of "innovation." They define this as the generation, acceptance, and implementation of new ideas, processes, products, or services for the first time in an organizational setting, and measure it by the number of new programs or services successfully implemented by an organization over a three-year period. However, it appears that their measure was somewhat more subjective than might be guessed from their definition. The authors interviewed the organization heads (16 health and welfare organizations in a midwest urban center), and made judgments about what constituted an innovation based on these interviews.

Mahoney and Weitzel entered their variables into a multiple regression equation with an overall effectiveness rating as the predicted criterion. Based on this, they found that "initiation" was one of seven (out of 24) factors that produced a .74 multiple correlation with effectiveness. "Flexibility" was not one of these seven factors. (When all 24 factors were entered into the multiple regression equation, an R of .76 was found, only .02 higher than the seven-factor equation.)

Aiken and Hage related their measure of innovation to a number of measures of other organizational factors. Several were statistically significant at $\alpha = .05$ or better and the actual values were as follows: degree of complexity (number of occupational titles) .59; professionalism (degree of extra organizational political activity) .63; intensity of scheduled and unscheduled communications, .53 and .61, respectively; and formalization of rules and procedures (presence of a rules manual) -.60.

Goodman (1970) did not measure the innovation dimension in any direct way, but he presented 46 managers with a list of eight organizational criteria, two of which were called "quick reaction capability" and "flexibility of staffing." He then asked the managers to rank these criteria in terms of their importance for organizational design. "Quick reaction" ranked fifth, "flexibility" sixth.

Finally, Olmstead (1972) attempted to operationalize Bennis' (1971) model of an organization in a laboratory simulation study. He postulated four components of organizational competence, one of which he called Adaptability, defined as coinciding with the problem solving ability and flexibility of the organization. He measured Adaptability by having the communications among subject groups scored for the presence or absence of a specific process and the quality of performance of that process. A communication was categorized into one of seven processes (sensing, communicating sensed information, decision making, stabilizing, communicating implementations, coping actions, and feedback) and was scored for adaptability if it fell into one of three: decision making, communicating implementation, and coping actions. Unfortunately, exact scoring details were not given. Olmstead also had an effectiveness score (as evaluated by field grade officers) for the ten groups (N = 12 in each group) of Army officers that participated in the study. Adaptability correlated .79 with effectiveness as follows: decision making, .78; communicating implementation, .75; coping actions, .70.

Summary.

It appears that this dimension is positively related to overall effectiveness, and is thought to be of "middling" importance to managers. Aiken and Hage's data also seem to indicate that flexibility may be negatively related to the degree to which rules and procedures have been formalized.

Flexibility -- Adaptation				
Source	Sample	Operational Form	Related To	Relationship Found
Aiken & Hage (1971)	Interviews with 520 staff members of 16 health and welfare organizations in a midwest metropolis.	Number of new programs or services successfully implemented by the organization during a three-year period -- as determined from interview data.	Several organizational factors: complexity, professionalism, intensity of schedule communications, intensity and direction of unscheduled communications, formalization of rules and procedures, slack resources, joint programs, percent size increase, history of innovation. Nothing	All of the variables were significantly correlated with flexibility - adaptation as they measure it. ($p > .05$)
Goodman (1970)	46 managers	Managers rank ordered eight criteria in terms of importance to organizational design. Two of these were "flexibility of staffing" - ability to apply human resources when and where needed, and "Quick reaction capability", ability to react quickly to changes.		"Flexibility of staffing" was ranked sixth, "Quick reaction" was ranked fifth.
Mahoney & Weitzel (1969) Weitzel, Mahoney & Crandall (1971)	Questionnaire data, 283 subunits of organizations across a variety of types of organizations.	Two statistical factors (from the questionnaire data), called "Flexibility" - willingly tries out new ideas and suggestions, ready to tackle unusual problems, and "Initiation" - initiates improvements in work methods and operations.	A rating of overall effectiveness for each subunit, as part of a multiple regression equation.	Various configurations of the factors were found (in a step-wise regression), for different types of organizations and different levels of management. "Initiation" was one of seven factors that contributed much to the regression equation, "flexibility" was not.
Olmstead (1972)	10 groups of 12 military officers participated in an eight-hour simulation of a battalion staff engaged in internal defensive activity.	Measured "Adaptability" by scoring the communications sent by the groups for the presence of and quality of performance of three processes: decision-making, communicating implementation, and coping actions. (Method of scoring not given in detail.)	Overall rating of effectiveness of group as evaluated by experienced field grade officers using pre-established criteria.	"Adaptability" correlated .79 with effectiveness, the process making up "adaptability" correlated with effectiveness as follows: decision making, .78, communicating implementation, .75, coping action, .70.

Goal Consensus

This variable refers to the degree to which all individuals perceive the same goals for an organization. This variable is distinct from actual commitment to those goals.

There have been three fairly direct attempts to measure goal consensus in organizations and one experimental study that indirectly approaches the measurement of goal consensus. Relative to the latter, Sherif (1957, 1958), in his study of twelve-year-old boys at summer camp, imposed superordinate goals (compelling and highly appealing goals that require the cooperation of two or more groups for their achievement) on groups that were in conflict. The groups' level of conflict lessened after they expended effort toward achieving these goals. While Sherif made no attempt to measure the consensus of the groups' perception of the goal or goals they sought, it seems a fairly safe assumption that such consensus existed, since the groups cooperated in attempting to achieve these goals. All this says, and admittedly in an indirect fashion, is that goals which are compelling, highly appealing, and require cooperation for their achievement are probably goals about which consensus can be found or reached.

The three direct attempts to measure goal consensus are those by Simpson and Gulley (1962), Vroom (1960), and Lawrence and Lorsch (1967). Simpson and Gulley mailed a questionnaire to voluntary organizations in which they asked (among other things) how many goals the organization was pursuing. If the organization was pursuing four goals or less they called the organization "focused," if more than four goals, "diffuse." Their obvious assumption was that the more goals the more diffusion of purpose which in turn might lead to less consensus. This inference is ours, not theirs.

Vroom (1960) and Lawrence and Lorsch (1967) approached the problem by submitting lists of goal statements (Vroom) or organizational criteria (Lawrence & Lorsch) to organization members who then ranked these stimuli in order of preference or importance. Vroom had individuals rank goal statements in order of their own preference and in order of preference as they thought top management would rank the goals. He also had managers rank the statements according to their own preferences. Lawrence and Lorsch had various members (managers, scientists, and engineers) of six organizations choose the three top organizational criteria from a list of ten, and then choose the next three most important. These criteria were supposedly related to product and process innovation in an organization.

Vroom does not report the correlation of subordinate rankings and management rankings, but was concerned instead with attitudes toward the organization and with the accuracy of perceptions of organizational goals and perceived agreement of organizational goals. In fact, he partialled out "real" agreement when he correlated the variables just mentioned. However, he does report that middle and top managements' goal statement rankings correlated .76.

Lawrence and Lorsch label their criterion rankings as the "goal orientation of members" and they were primarily concerned with the relationship of goal orientation to "differentiation" of the various subsystems of an organization. They were more concerned with uncovering a lack of goal consensus and their study was an ambitious attempt to cover many variables, but at some cost in rigor, as they themselves point out.

Summary.

Goal consensus has been primarily measured by a ranking procedure, wherein organization members make their goal preferences known. These lists can then be correlated to see how much consensus exists within the organization across levels, for instance (or within a level).

Goal Consensus				
Source	Sample	Operational Form	Related To	Relationship Found
Lawrence & Lorsch (1967)	216 managers, scientists, and engineers in six organizations.	Subjects chose the three most important and three next most important organizational criteria from a list of 10 criteria seen as relevant to product and process innovation. The 10 criteria fell into three categories of "orientation" — market, technical-economic, science.	Membership in a functional subsystem of the organization, each of which supposedly operates in a different environment and would demand different goal orientations. The subsystems were sales, applied research, fundamental research, production.	Sales personnel in all six organizations chose market criteria as most important; production personnel in all six organizations chose technical - economic criteria; applied research personnel in five organizations chose technical - economic, one chose science; fundamental research personnel split evenly, three chose science, three chose technical-economic.
Sherif (1957-1958)	Naturally occurring groups of boys (11-12 yrs. old) at a summer camp.	Authors imposed superordinate goals (compelling, highly appealing goals requiring cooperation of groups for their achievement) on groups in conflict. Presumably, consensus was reached on these goals.	Group Conflict.	Conflict between groups was reduced after imposition of the superordinate goal and attempts to achieve it by cooperation were made.
Simpson & Gulley (1962)	Mail survey of 211 voluntary associations.	Classified organizations as having focused on diffuse goals (focused = 1-4 stated goals, diffuse > 4 goals), presumably less goal consensus in diffuse goal organizations.	Degree of centralization, membership involvement, and internal communication of the associations.	No clear relationships found because the authors included another dimension, internal vs. external orientation, in the analysis, classifying organizations as focused - internal, focused - external, diffused - internal, diffused - external. They did not present results for just focused vs. diffuse organizations. (No statistical tests were made at all because the sample was not random, only order of median scores examined.)
Vroom (1960)	1676 employees in large industrial organization.	Workers ranked goal statements in order of their preference and in order of preference they thought top management would have. Management ranked goal statements in order of their preference.	Attitudes toward the organization, and also related rankings to one another for middle and top management.	Did not correlate the worker and management goal rankings, but middle and top management goal rankings correlated .76. Favorability of attitude toward organization correlated .28 ($p < .01$) with perceived agreement of worker-management goals. Those with favorable attitudes more accurately perceived those organizational goals with which they agreed than they did those with which they disagreed. Partial support found for notion that those with unfavorable attitudes would more accurately perceive goals with which they disagreed than those with which they agreed.

Role and Norm Congruence

This variable is seen as the degree to which the members of an organization are in agreement on such things as what kinds of supervisory attitudes are best, performance expectations, morale, role requirements, etc.

The Michigan researchers (Georgopoulos, 1965; Smith & Ari, 1963, 1964) have conducted most of the work with this variable, but two other studies are also relevant (Aram, Morgan, & Esbeck, 1971; Friedlander, 1966).

The Michigan group used a questionnaire methodology with their sample of delivery truck organizations in an attempt to get at several parameters of role and norm congruence, or consistency. Almost always, five-point Likert formats were used for such questions as, "How do you feel about the morale in your station?" "How do the men in your station feel about the morale?" "To what extent do people in the different jobs in your station see eye to eye on things concerning the everyday operations of the station?" etc. Using such items Smith and Ari measured "member uniformity or consensus" by focusing on the relative similarity in item responses. Georgopoulos used similar items to determine: (a) internal normative consistency--or the extent of the similarity between prevailing and desired norms in an organization; (b) normative congruence--or the extent of similarity between the "generalized" and corresponding individual aspects of norms; (c) normative consensus--or the degree of agreement within groups; and (d) normative complementarity--or the extent to which expectations of interacting groups about norms that involve their relationships are similar or complementary.

Usually one to three questions serve as the operational form for the concepts outlined above, and averages of all the individual scores are used as the organization or group scores. The Michigan researchers have usually correlated these measures with measures of productivity and/or ratings of overall organizational performance, generally finding significant positive correlations.

Aram et al. used 18 statements derived from the literature concerning interpersonal relationships on project teams as operational attempts to measure the degree of collaboration and consensus existing in an organization. The subjects, who were scientists, engineers, and lab technicians in a rubber manufacturer's research and development center, allocated five points to two options for each of the 18 statements. One option described a collaborative-consensual orientation while the

other described a coercive-compromise orientation. The total collaboration-consensus score and several component scores were then correlated with a rating of the research team's effectiveness. No significant correlations were found.

In his factor analytic study (principal components, varimax method on 70 questionnaire variables with 91 subjects from three hierarchical levels of a government research and development organization), Friedlander identified a factor he called "Role and Idea Conformity," which was defined by three items: (1) others act the role expected of them, (2) divergent ideas are discouraged at meetings, and (3) the chairman (of meetings) is oriented toward production and efficiency. However, the factor accounted for only two percent of the common variance.

Summary.

All attempts to measure this variable were via questionnaires; however, the three studies outlined above seem to each be measuring a somewhat different aspect of this variable. Georgopoulos and Smith and Ari report finding significant positive relationships between their measures and overall effectiveness, while Aram et al. did not. Friedlander did not relate his factor to effectiveness. We might question whether the small number of items researchers have employed as operational forms of their concepts are adequate for the task of measuring those seemingly complex notions.

Role and Norm Congruence				
Source	Sample	Operational Form	Related To	Relationship Found
Aram, Morgan, & Esbeck (1971)	110 scientists, engineers, and lab technicians at a research center of a rubber manufacturer. 16 work groups.	Subjects allocated five points between a "collaborative-consensual" orientation and a "coercion-compromise" orientation for each of 18 statements drawn from literature on interpersonal relationships on project teams. Obtained a "collaboration-consensus" total score and three component scores.	Overall work group performance rating by three experts using paired comparison technique.	Correlated effectiveness and collaboration - consensus total and component scores, no significant correlations found.
Friedlander (1966)	91 members of a government research organization from three hierarchical levels.	Statistical factor derived from analysis of 70 questionnaire items, called "Role and Idea Conformity", defined by three items, deals with: acting role expected of one, discouragement of divergent ideas, and leader orientation toward production and efficiency. Accounted for two percent variance. KR-20 = .52, six month test-retest = .51.	Nothing.	
Georgopoulos (1965)	32 units of a nationwide retail delivery organization.	Variable called "Internal Normative Consistency", measured by the correlation of two questions concerning influence possessed and "should be" possessed by the station manager, other supervisors, the workers. Stations were rank ordered and then dichotomized on their correlation values. (The correlations ranged from -.30 to .84).	Organizational effectiveness ratings and productivity data, dichotomized stations on these variables also.	Computed phi's between the dichotomized "Consistency" variable measures and the dichotomized effectiveness measures. Phi's ranged from .38 - .50, $p < .01$.
Georgopoulos (1965)	32 units of a nationwide retail delivery organization.	Variable called "Normative Congruence", measured by the correlation between two questions about morale (How do you feel about station morale and how do the men feel about station morale). Dichotomized stations based on correlations value. (These correlations ranged from .48 to .92)	Organizational effectiveness ratings and productivity data, dichotomized stations on these variables also.	Computed phi's between two effectiveness measures and the "congruence variable" equaled .25 in both cases, $p < .05$.

Role and Norm Congruence (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Georgopoulos (1965)	32 units of a nationwide retail delivery organization.	Variable called "Normative Consensus", measured by response to a question asking to what degree people in different jobs in the station saw eye to eye on operational matters. (5-point Likert response.)	Organizational effectiveness ratings and productivity data, dichotomized stations on these variables also.	Correlated consensus, effectiveness, and productivity. $r = .54$ between consensus and productivity, $.55$ between consensus and effectiveness. (both $p < .01$)
Georgopoulos (1965)	32 units of a nationwide retail delivery organization.	Variable called "Normative Complementarity", measured by mean station scores on three questionnaire items. (Extent to which 1.) what supervisors expect is right 2.) supervisor is not unnecessarily strict 3.) organizational pressures for performance are not unreasonable), 5-point Likert Scale responses.	Organizational effectiveness ratings and productivity data, dichotomized stations on these variables also.	Correlated the three items with the two effectiveness measures, all r 's significant at $.01$, ranged from $.49$ to $.64$.
Smith & Ari (1963-1964)	32 units of a nationwide retail delivery organization.	Variable called Member Uniformity or Consensus, measured by various questionnaire items on work group standards, member support of organization and supervisory behavior, and overall consensus.	Total control and positive slope of a "control graph" (degree of democratic supervision form) and productivity .	10 separate consensus measures were inter-correlated, with generally low intercorrelations. Total control correlated significantly with five of the 10 consensus measures, while degree of positive slope had only two of 10 significant correlations. A combination of the 10 consensus measures significantly positively with total control, morale, and productivity. It did not correlate with positive slope of the control graph.

Managerial Task Skills

This variable refers to the overall level of skills the organization's managers, commanding officers, or group leaders possess for performing tasks centered on work to be done, and not the skills employed when interacting with other organizational members.

This aspect of managerial skill has seen relatively little research when compared to managerial interpersonal skills. Two studies using factor analysis have yielded factors that seem to tap this variable. From their analysis of survey questionnaires completed by members of 283 organizational subunits, Mahoney and Weitzel (1969) derived a factor they named "Planning." It was characterized by such things as having operations planned and scheduled to avoid lost time and by devoting little time to minor crises. Seashore and Yuchtman (1967), in their analysis of an insurance company's records, found a factor they named "Management Emphasis." However, it was defined by only one high loading, that for manager's commissions. Seashore and Yuchtman comment that they think it may reflect a manager's emphasis on short-run gains by doing more selling himself, rather than emphasizing long-run gains by developing his staff.

Bowers and Seashore (1966) used questionnaire items to tap a variable they call "work facilitation." They define this as behavior that helps achieve goal attainment by doing such things as scheduling, coordinating, planning, and providing tools, materials, technical knowledge or other resources. They measured this variable at the "peer" and "manager" level.

Finally, Goodman (1970) asked 46 managers to rank "ability to provide good technical supervision" along with seven other criteria of organizational effectiveness in terms of importance for organizational design. The managers ranked it fourth.

In addition to the studies mentioned above, two studies used some form of overall ranking or other measure that partially incorporated the "task skill" notion. That is, the studies considered the total performance of the manager. Rosen (1970) had members of seven work groups (ten per group) rank all the foremen (of the groups) on overall preferability; Kavcic, Rus, and Tannenbaum (1971) had 17 "experts" familiar with four Yugoslavian manufacturing plants rank order the plants in terms of management quality.

As already noted, little has been done in the way of operationalizing the measurement of Managerial Task Skills, and what has been done does not appear extremely useful. Perhaps this is due to the small amount of knowledge existing about the tasks that managers actually perform (Campbell, Dunnette, Lawler, & Weick, 1970).

Relationship to Other Variables.

Bowers and Seashore found no relationship between their measure of three dimensions of leadership and the criterion factor tapping the managers' task performance.

Kavcic et al. found a perfect rank order correlation between the ranking of management quality and the ranking of overall effectiveness, but recall that $N = 4$ here. Lieberman and O'Connor (1972) found that a change in top management leadership accounted only for very small percentages of sales, income, and profit when compared to the variance accounted for by industry type and position of the organization within the industry. Rosen found that work unit performance correlated highly with foreman preference before the foremen were shifted around on short notice, that the correlation dropped to zero shortly after the shift and then reached near pre-shift levels eleven weeks later.

Finally, Seashore and Yuchtman did not relate the "Management Emphasis" factor to any other variables, but examined its stability over a ten-year period, concluding that it had an intermediate level of stability.

Summary.

The amount of managerial task skills in an organization have not been inventoried in any systematic way. There has been no real attempt to tap this variable operationally, short of Mahoney and Weitzel's questionnaire that yielded the "Planning" factor. It is true that the familiar instruments of leadership behavior (Leadership Opinion Questionnaire, Leadership Behavior Description Questionnaire) give measures of the amount of structure imposed by leaders, but this is really an interpersonal relationship measure and is dealt with in that section of this report.

It appears from the little evidence available that Managerial Task Skills are probably positively related to organizational effectiveness. One would be surprised if it were otherwise.

Managerial Task Skills				
Source	Sample	Operational Form	Related To	Relationship Found
Bowers & Seashore (1966)	40 life insurance agencies.	Statistical factor derived from analysis of 70 archival performance measures. Defined by manager's commissions, may reflect the extent to which the manager performs tasks rather than training staff to perform them. Also a questionnaire measure of a leadership factor called "work facilitation". Measured at peer and manager level.	Questionnaire measures of three postulated factors of a leader's performance support, goal emphasis, and interaction facilitation; as measured at the peer and manager level.	No significant correlation between the statistical factor and the leadership dimensions.
Goodman (1970)	46 managers	Rank ordering of eight criteria of organizational performance in terms of their importance for organization design, one of these eight being "ability to provide technical supervision."	Nothing	Ability to provide technical supervision was ranked fourth by the managers.
Kavcic, Rus, & Tannebaum (1971)	Four manufacturing plants in Yugoslavia.	17 experts rank ordered the plants in terms of the quality of their management.	Not directly related to any other variables, used as one of seven criteria to rank the four organizations.	Measure had a perfect rank-order correlation with expert's ranking of overall effectiveness, which correlated perfectly with total control. However, all results were primarily descriptive because of low n.
Lieberson & O'Connor (1972)	Records from industry manuals of 167 companies over the period 1946-1965.	Changes in leadership as defined by the selection of a new president or chairman of the board.	Sales, net income, and profit margin.	Leadership changes accounted for six percent of sales variance, seven percent net income variance, 14 percent of profit margin variance. These were small amounts compared to variance accounted for by industry type or company position within industry.
Mahoney & Weitzel (1969)	Subjects were members of 283 organizational subunits in a variety of types of organizations.	Statistical factor derived from analysis of 114 questionnaire items tapping organizational effectiveness variables. Called "Planning", defined as operations planned and scheduled to avoid lost time and little time spent on minor crises.	A rating of overall effectiveness of the subunit supervisor's superior, in a regression equation with 23 other factors.	Multiple R was .76, and Planning was one of seven factors whose multiple R with the overall effectiveness rating was .74.

Managerial Task Skills (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Rosen (1970)	Seven work groups in a furniture factory. N = 10 in a work group.	Mean ranking of work group foremen by their group's members, the members ranking the foremen in terms of overall preferability.	Six other variables, performance, time spent on a model, cohesion, consensus, money-motivation, management pressure; all measured before and after the group foremen were shifted on short notice.	The intercorrelation matrices were examined as they changed over time, before and after the foremen shift. Of most interest, foremen preference originally correlates .62 with performance (before foremen shift), dropped to zero after the shift, and 11 weeks later correlates .54 with performance.
Seashore & Yuchtman (1967)	75 insurance agencies	Statistical factor derived from analysis of archival records, called "Management Emphasis". Same factor as described in Bowers & Seashore above.	None, analyzed for stability over a 10 year period.	Correlated factor scores from 1952, 1957, and 1961, correlations were: 1952-1957, .36, 1957-1961, .67, and 1952-1961, .29. Authors called this intermediate stability.

Managerial Interpersonal Skills

This variable refers to the level of skill and efficiency with which the management deals with superiors, subordinates, and peers and includes the extent to which managers give support, facilitate constructive interaction, and generate enthusiasm for meeting goals and achieving excellent performance. It is meant to include such things as consideration, employee centeredness, etc. We realize that this variable is often used as a "predictor" of other variables. However, within some models of organizational effectiveness (e.g., Likert and OD) it has the character of a systemic variable which is indicative of an organization's health. We wish to concentrate on this latter orientation.

Some fairly common instruments are used to measure this variable such as Fiedler's Least Preferred Co-Worker (LPC) (Lawrence & Lorsch, 1967), the Leadership Opinion Questionnaire (e.g., Oaklander & Fleishman, 1963) and the Leadership Behavior Description Questionnaire (Korman, 1966). Other studies have employed less familiar measures, but still of the questionnaire type.

Bowers and Seashore (1966) used Likert-type questionnaire items in an attempt to measure "support" (behavior enhancing someone else's feeling of personal worth and importance), "interaction facilitation" (behavior encouraging members of a group to develop close, mutually satisfying relationships), and "goal emphasis" (behavior stimulating enthusiasm for meeting the group's goals or exhibiting excellent performance). Both peers and managers received scores. Indik, Georgopoulos, and Seashore (1961) used two questionnaire items to tap each of four dimensions of superior-subordinate relationships: openness of communication channels, degree of subordinate satisfaction with supervisor's supportive behavior, degree of mutual understanding between organizational members, and degree of felt influence on organizational operations by subordinates and their supervisors.

Marcus (1962) attempted to measure the orientation of a supervisor with questionnaire items answered by the supervisor's subordinates. Orientation was defined as the degree to which a supervisor followed an established procedure. Using the subordinate's responses, Marcus dichotomized the supervisors, with high scorers labeled "procedure-oriented" and low scorers, "group-oriented."

Except possibly for the LPC, LOQ, and LBDQ, little evidence exists about the validity, construct or otherwise, of these measures. Data are usually limited to one study and little detail is given concerning the development of the measures.

Finally, as reported in the section on Managerial Task Skills, several overall measures of managerial skill or managers "as a whole" were discussed (Rose, 1970; Kavcic, Rus, & Tannenbaum, 1971; Lieberman & O'Connor, 1972). Those measures are probably also tapping Managerial Interpersonal Skills to some degree.

Relationship to Other Variables.

Bowers and Seashore found that their leadership measures were positively correlated with satisfaction regarding four facets of the job (company, fellow agents, income, and manager). Thirteen of fifty-six correlations between the leadership measures and seven statistical factors of organizational performance were significant.

Indik et al. found their measures of superior-subordinate relationships positively related to effectiveness, slightly less so with productivity.

Lawrence and Lorsch related the LPC scores to type of organizational subunit and found that they scored in the following order (high or social orientation scores first, low or task orientation scores last): sales, applied research, fundamental research, and production.

Two studies related Consideration and Initiating Structure to other organizational variables. Oaklander and Fleishman found these variables negatively related to the intraunit stress of work groups in New York City hospitals, but unrelated to interunit stress. Parker found initiating structure positively correlated with order-pricing errors in a sample of pharmaceutical warehouses, but no relationship between consideration and errors. Neither variable was related to productivity.

The studies by Kavcic et al., Lieberman and O'Connor, and Rosen are dealt with in the section on Managerial Task Skills and are not repeated here.

Summary.

Aside from the findings by Indik et al. little evidence exists showing Managerial Interpersonal Skills to be related to other organizational criteria. Since there exists some fairly well known instruments for tapping this variable, it should be relatively easy to collect additional data, if one had the inclination.

Managerial Interpersonal Skills				
Source	Sample	Operational Form	Related To	Relationship Found
Bowers & Seashore (1966)	40 life insurance agencies	Questionnaire items tapping degree to which leader gives "support," provides "interaction facilitation", and provides "goal emphasis". Measured at both "peer" and "manager" levels.	Seven statistical factors tapping organizational performance, derived from factor analysis of 70 archival performance records, and five facets of satisfaction.	Satisfaction with company, fellow agents, income, and manager were, for the most part, significantly positively correlated with the three leadership measures, but satisfaction with job had only two (of six) significant correlations. Thirteen of 56 correlations between the leadership measures and performance measures were significant at .05, six of these were correlations with a factor named "staff-clientele maturity" which reflected the age and experience of agent staff and clientele, high scores on the factor reflecting older, experienced staff and clients (and higher premiums on policies). Four of the significant correlations were with the "Business Costs" factor, two with "Advanced Underwriting", and one with "Business Volume".
Indik, Georgopoulos, & Seashore (1961)	27 work units of a nationwide retail delivery organization.	Two questionnaire items for each of four dimensions of superior-subordinate relationships: openness of communication channels, degree of subordinate satisfaction with supervisor's supportive behavior, degree of mutual understanding between organization members, and degree of felt influence on organizational operations by subordinates and their superiors.	Mean productivity of station members and an "overall effectiveness" rating of each station by six or more managers.	The eight questionnaire items were correlated with the effectiveness and productivity measures. Both "openness" items correlated significantly positively with effectiveness but not productivity; both "satisfaction" items correlated significantly positively with effectiveness, only one did so with productivity; the same pattern of correlations existed for the "understanding" items as did for "satisfaction". Both "influence" items correlated significantly positively with effectiveness and productivity. The highest of all these correlations was .48, the lowest correlation was .21 (non-significant for N=27).

Managerial Interpersonal Skills (cont.)

Source	Sample	Operational Form	Related To	Relationship Found
Kavcic, Rus, & Tannenbaum (1971)	Four manufacturing plants in Yugoslavia.	17 experts rank ordered the plants in terms of the quality of their management.	Not directly related to any other variables, used as one of seven criteria to rank the four organizations.	This measure had a perfect rank order correlation with expert's rankings of overall effectiveness, which correlated perfectly with total control. (However, all results were primarily descriptive because of low n.)
Lawrence & Lorsch (1967)	216 managers, engineers, and scientists in six organizations.	Administered the Least Preferred Coworker (LPC) scale.	Membership of the subject in one of four functional subsystems of the organization. (Sales, applied research, fundamental research, production).	Computed descriptive statistics, ran no tests for mean differences of the LPC scores, but found that the subsystems generally scored in the following order on the LPC (from high to low scores, or social to task orientation) sales, applied research, fundamental research, production.
Lieberson & O'Connor (1972)	Records from industry manuals of 167 companies over the period 1946-1965.	Changes in leadership as defined by the selection of a new president or chairman of the board.	Sales, net income, and profit margin.	Leadership changes accounted for six percent of sales variance, seven percent net income variance, 14 percent of profit margin variance. These were small amounts compared to variance accounted for by industry type or company position within industry.
Marcus (1962)	12 work groups of five caseworkers and one supervisor in an urban department of welfare.	Questionnaire items, answered by workers, concerning the degree to which their supervisor sticks closely to established procedures or is willing to make reasonable exceptions to procedures.	Measures of cohesion and group productivity.	
Mulder, Ritsema, & deJong (1971)	15 officers in Dutch Navy were focal subjects, but subordinates and outside experts also participated.	Factor analysis of ratings yielded four factors describing leadership behavior in a "crisis" situation; these were individual prominence, social emotional leadership, (more commonly known as Consideration) task leadership (more commonly known as Initiating Structure), and recognition orientation. The "prominence" factor had items like: is decided in his way of acting, gives evidence of self-confidence, shows strong personality, loading on it. The three highest loading items on the recognition orientation factor were: likes to be admired, is keen on recognition, and likes to come in the front.		

Managerial Interpersonal Skills (cont.)				
Source	Sample	Operational Form	Related To	Relationship Found
Oaklander & Fleishman (1963)	118 supervisors in three New York City Hospitals, all with at least six subordinates.	Supervisors completed the Leadership Opinion Questionnaire, obtained Consideration and Initiating Structure scores.	Questionnaire measures of inter-unit and intra-unit stress. 10 items, total, completed by the supervisor, six for inter-unit stress, four for intra-unit stress.	Correlated consideration and structure with the stress measures, in large government hospital and two smaller, voluntary hospitals. Both C&S were negatively correlated to intra-unit stress (-.37 & -.41, $p < .01$) and unrelated to inter-unit stress in the large hospital. In the small hospitals, the only significant correlation was between S and inter-unit stress. (.36 ($p < .05$)).
Parker (1963)	80 warehouses of a large pharmaceutical company, work group N average = 24.	Administered Leadership Opinion Questionnaire, obtained scores on Consideration and Initiating Structure.	Measures of work group performance (productivity and errors).	Initiating Structure correlated .23 ($p < .05$) with order-pricing errors, no significant correlations with productivity. Consideration did not correlate significantly.
Rosen (1970)	Seven work groups in a furniture factory, N=10 in a work group.	Mean ranking of the work group foremen by their group's members, the members ranking the foremen in terms of overall preferability.	Six other variables: performance, time spent on a model, cohesion, consensus, money-motivation, and management pressure. All measured before and after the group foremen were shifted on short notice.	The intercorrelation matrices were examined as they changed over time, using measures taken several times both before and after the foremen shift. Of most interest, foremen preference originally correlates .62 with performance (before shift), dropped to zero after the shift, and 11 weeks later correlates .54 with performance.

Information Management and Communication

This variable refers to the collection, analysis, and distribution of information critical to organizational effectiveness. Included is the degree to which: (a) mechanisms for ongoing monitoring of pertinent information are established, (b) some method for filtering biases from collected information is used, (c) a regular and efficient channel of distribution of relevant information to concerned organizational members is established, and (d) informal communication lines transmit organizationally valuable information.

Three studies employed questionnaires to tap various aspects of this variable. Simpson and Gulley (1962) attempted to obtain information about the extent to which organizations keep their members informed of organizational activities, educate members about organizational objectives, and keep organizational leaders informed of their (member's) opinions. Questions tapping these items appeared on a survey mailed out to 211 voluntary associations. Berkowitz and Bennis (1961) used a questionnaire instrument they called the Personal Contact Check List, which attempts to tap the initiation and frequency of subject matter of importance and satisfaction derived from communication. They gave the questionnaire to 90 nurses in seven out-patient departments of a large metropolitan area and report some interesting descriptive data concerning both the direction of communications and the five communications parameters just mentioned. Briefly, they found that all communications are seen as satisfying, initiation and frequency were negatively related to the hierarchical level of the other person, contacts with superiors were seen as more important than contacts with peers or subordinates, and the results on content of communications were too tentative to place much weight on them.

Walton (1963), in a study in which he puts forth a "magnetic" theory of communication, also used a questionnaire approach. He asked 100 employees in a large governmental laboratory to nominate persons with whom they would communicate about items from four content areas. These content areas were the four traits that Walton believed "attracted" communications: (1) authority or assigned, legal right of command; (2) power of personal capacity to influence; (3) expertise or knowledge required by the organization; (4) sociability or that quality of character that makes for enjoyable social interactions with others. Using these nominations, Walton derived communication "centers." He found that three traits gave rise to communication centers--authority, power, and expertise, while the fourth trait, sociability, did not. (This was because 80 percent of his entire sample was nominated as being communicated with

because of this factor.) Walton believes that the persons who are these "magnetic centers" are the real management of the organization. It would be interesting to compare the "magnetic centers" found by Walton's method with the official communication hierarchy of an organization.

Mahoney and Weitzel (1969) in their factor analysis of questionnaire items drawn from organization theory (responded to by members of 283 organizational subunits of various types) derived a factor they named communication. They characterize it as a state of having free flow of work information and communications within the organization. However, this factor did not account for more than a negligible amount of variance and when placed in a stepwise multiple regression equation with other factors to predict an overall effectiveness rating, it did not contribute significantly to the level of prediction (Mahoney & Weitzel, 1969; Weitzel, Mahoney, & Crandall, 1971).

Goodman (1970) presented 46 managers with a list of eight criteria for the design of organizations (origins of the criteria not given), one of which was ease and accuracy of communications. The managers ranked these eight criteria in order of importance for organizational design. Communications was ranked second.

Two nonempirical articles seem worth mentioning. Gibb (1964) describes two polar "approaches" in organizational communication while Fenn and Yankelovich (1972) outline several communication aids or devices that operating organizations either have implemented or perhaps should do so (in their view). Gibb shows that the "persuasion approach" to communication puts communication in the role of an independent variable, a device to be used to bring about effective operations; while the "problem solving approach" to communications puts communication in the role of a dependent variable, a symptom of the "health" of an organization. It is the latter context we are attempting to use here.

Summary.

Several variations of questionnaires have been used to tap communications within an organization, and usually across hierarchical lines. Work that attempts to measure information flow across the organization's outer boundaries is nonexistent in the literature reviewed here. Some of the questionnaire approaches reviewed seem quite useful, and some fusion of Walton's, Berkowitz and Bennis', and perhaps Mahoney and Weitzel's approach might be useful.

Almost completely missing is an observational approach to measuring communication patterns and content. Observational techniques in ongoing situations have been used elsewhere (Barker & Wright, 1955) and could probably be useful for measuring this variable in an organization. (However, Walton did have his subjects complete a log of their communications over a two-day period.)

Information Management and Communication				
Source	Sample	Operational Form	Related To	Relationship Found
Berkowitz & Bennis (1961)	90 nurses working in seven out-patient departments in a metropolitan area.	Administered the Personal Contact Check List, a questionnaire that taps five parameters of communication: initiation, frequency, subject matter, importance, satisfaction.	The effect of different hierarchical levels on the communication parameters. (That is, the level of the "other" on communication by subject.)	Initiation and frequency negatively related to hierarchical level of other, contacts with superiors seen as more important than contacts with peers or subordinates, all contacts seen as satisfactory or very satisfactory, content findings were very tentative.
Goodman (1970)	46 managers	Managers rank ordered eight criteria of organizational design in terms of their importance for organizational design. One of these was the ease and accuracy of communications.	Nothing.	Communications was ranked second out of the eight criteria.
Mahoney & Weitzel (1969)	Members of 283 organization subunits from various types of organizations.	Statistical factor derived from analysis of 114 questionnaire items, called "Communication", defined as free flow of work information and communications within the organization.	A rating of the overall effectiveness of the subunit by the superior, along with 23 other dimensions in a multiple regression equation.	Multiple R = .76, but communication was not one of a subset of 7 of the 24 dimensions that yielded a .74 R, thus it did not add much to the prediction equation.
Simpson & Gulley (1962)	Mail survey of 211 voluntary associations.	Three questionnaire items tapping education of organization members about organizational objectives keeping members informed of organization activity, and members keeping leaders informed of their activities. Labelled this "internal communication".	A classification of organizations into four classes on the basis of focused or diffused goals and internal or external orientation of the organization.	Computed the median scores for the organizations in each of the four classes for "internal communication". They ranked, in order from high to low median scores: diffuse-external, focused-external, diffuse-internal, focused-internal. This supported the author's hypothesis that externally oriented organizations engage in more internal communication.
Walton (1963)	100 employees in a large government laboratory.	Questionnaires asking subjects to nominate persons with whom they would communicate about items falling into four areas (that author felt influenced communication patterns): authority, power, expertise, sociability.	No other variables.	Isolated "magnetic centers" of communication, actually central persons through which communications flowed. These centers were based on three of the four areas tapped on the questionnaire, all but sociability.

Readiness

The usual definition of this variable is in terms of an overall judgment concerning the probability that the organization could successfully perform some specified task if asked to do so. Work on measuring this variable has been largely confined to the military.

The Navy previously developed an index to reflect the readiness of its personnel system (Popper & Miller, 1965). The content consisted of a weighted sum of two personnel reports: the manning levels and rates authorized for a unit, and the actual personnel assigned to the unit. The basic notion involved is the comparison of actual human resources (in terms of numbers of personnel and their skills) to some desired state. Each desired state is given a relative importance weight. This weight is multiplied by the actual state, expressed on a 0 to 1 scale which indicates the degree of fulfillment (0 = none, 1 = complete) of the desired state. These products are then summed to give a single readiness index for an organization.

While several problems in the area of reliability, validity, acceptability, data collection, appropriate unit of analysis, and determination of "desired states" exist in this scheme (Dunnette, Milkovich, & Motowidlo, 1973) little empirical work has been done with the method.

Utilization of Environment

This dimension refers to the extent to which the organization successfully interacts with its environment and acquires scarce, valued resources necessary to its effective operation. For example, it includes the degree to which it acquires a steady supply of manpower and financial resources.

This variable is a favorite of the Michigan school but appears to be almost universally ignored by everyone else. The Michigan researchers (Seashore & Yuchtman, 1967; Yuchtman, 1966; Yuchtman & Seashore, 1971) theorize that no single measure will adequately represent this variable and have instead concentrated on a multivariate approach to the concept.

Thus it appears that this variable is similar to the variable "overall effectiveness," but approached from a somewhat different viewpoint--how successful the organization is in gaining and using (without depleting) the environmental resources. Yuchtman (1966) states that one must attempt to look at all such measures "at once" to determine how an organization is doing on this dimension.

In our attempt to partial out the total variance of organizational effectiveness, we have placed the various measures of environmental utilization found by Michigan workers into a number of categories.

Evaluations by External Entities

Such evaluations refer to evaluations of the organization or organizational unit by those individuals and organizations in its environment with which it interacts. Loyalty to, confidence in, and support given the organization by such groups as suppliers, customers, stockholders, enforcement agencies, and the general public would fall under this label.

No attempts to operationalize this variable were found. Kuin (1968), Aaker and Day (1972), and Thompson (1967) all discuss the variable and make some suggestions about how it might be measured. Kuin suggests opinion polls and the success an organization has in recruitment advertising. Thompson examines the variable in more detail. He postulates four sets of "criteria" that appear to represent it: social reference criteria, criteria visible to important environmental elements, criteria of interest to environmental elements the organization is dependent on, and expressions of confidence. He suggests methods that might be used to measure the first three. For social reference criteria he suggests such things as market share, level of research expenses, product developments, and increases in student body and faculty quality for educational organizations. For the next two criteria (visible to or of interest to important or supporting environmental elements), he suggests such things as growth capacity, ability to benefit employees or customers, keeping expenses at minimum and quality at maximum, public stock quotations, accrediting evaluations, admission and discharge rates (mental hospital), student-teacher ratios, dollars spent per pupil, dropout rates (schools), number of publications, research grants received, job offers (universities).

Again, no operational forms have been used for this variable, although some of the measures Thompson suggests have been used to tap other dimensions of effectiveness by other researchers (e.g., number of publications as a measure of productivity).

Stability

As per Stogdill's (1971) definition, stability refers to the maintenance of structure, function, and resources through time, and more particularly through periods of stress (Stogdill, 1971).

Although several authors have addressed the variable of stability conceptually (Cadwallader, 1960; Caplow, 1964; Stogdill, 1971; Selznick, 1948), no one has directly attacked the measurement of the variable. Drabek and Haas (1969) in a laboratory simulation study, observed the effects of stress on the structure of a work group, but made no formal measurements of stability. They did conclude that stress causes change in structure and usually at those parts of the system that showed signs of strain before stress was applied.

Internalization of Organizational Goals

This variable is defined as the acceptance or internalization of organizational goals by individuals within that organization. It includes their belief that the organization's goals are right and proper. This is not the extent to which goals are clear or agreed upon by the organization members (goal consensus and goal clarity, respectively). Thus it refers to the acceptance, not the understanding of the organization's goals.

Only one attempt to even indirectly measure internalization of organizational goals was found. Simpson and Gulley (1962) surveyed 546 members of national voluntary organizations and this questionnaire contained four items attempting to measure membership involvement. These items concerned the extent to which the members actively participated in the organization's work, promoted cooperation among the members, recruited members, and would "feel a terrible loss" if the organization did not exist. As can be seen, these items are certainly not tapping directly the internalization of ostensible organizational goals, but they do seem to be getting at some kind of "with it" feeling regarding the organization.

Value of Human Resources

This variable is a composite criterion, where the components refer to measures of individuals, and it refers to the total value or total worth of the individual members of an organization, in an accounting or balance sheet sense, to the organization. It is another way of combining many of the variables discussed so far but it deals only with the role that human resources, not other kinds of assets, play in organizational effectiveness.

The advocates of Human Resources Accounting (HRA), building on the ideas of Rensis Likert (1967), have been responsible for most of the efforts in this area. Likert's views can perhaps be summarized in the following way. Organizational effectiveness or productivity is determined by the efforts of the individual members of the organization. Following the precepts of the ISR systems model, the assumption is that the efforts of individuals can be reflected by the measurement of variables like satisfaction, cohesion, and morale; and further, increases in the value of these variables forecasts an increase in organizational performance or effectiveness.

Related to this assumption of the relationship of the individual variables mentioned above and organizational effectiveness, is the notion that the value of organization members can and should be reflected differently than it usually is (Flamholtz, 1971a, 1971b; Lev & Schwartz, 1971). These authors maintain that the value of human resources is consistently underestimated, if not completely ignored, in organizations. They further assume that this practice leads to several adverse effects: (a) When costs must be cut, the effects of such cuts on human resources are ignored causing liquidation or depletion of human resources in the form of lowered morale, motivation, and satisfaction and higher turnover and absenteeism. These effects in turn eventually lower organizational production and effectiveness. (b) Planning by managers fails to take into account the present value of human resources or the possible impact of future actions on this resource. (c) Actions to increase the value of human resources or even stem the loss of such resources are impossible without knowledge about the level or trends in changes of the level of such resources.

The common thread running through these points is that human resources are a valuable asset and must be as carefully managed as any other asset. The value of human assets simply must be considered to make sound organizational decisions and maintain or increase organizational effectiveness. Unfortunately, they first must be measured.

Proposed Measures

Precisely how to measure and represent the value of human resources is a problem. Several answers have been proposed, but little empirical work exists.

Pyle (1970) argues that there are two complementary approaches to placing a value on human resources. "The first approach relies upon extending to human resources, accounting concepts and procedures that

are currently employed in the management of physical and financial resources (p. 24-25)." "The second approach to human resource accounting focuses on the development of alternative means for assessing the productive capability of human resources and how this may be changing through time (p. 25)." In this second approach, Pyle is speaking of the measures of leadership, team skills, and other social-psychological measures including motivation, satisfaction, cohesion, and morale.

Relative to the first approach described by Pyle, Flamholtz (1971b, 1972) proposes to use the individual as the unit of analysis, maintaining that aggregate measures can always be formed from individual data if measures of work groups or whole organizations are desired, while it is usually more difficult to disaggregate measures of entire work groups or organizations to obtain individual data. Briefly his model views the individual as a mobile entity, moving through organizational roles over time. Since mobility cannot be absolutely predicted his model is a stochastic one. As the individual moves through various roles, he performs services connected with these roles for the organization. The value of the individual to the organization is the sum of the present values of the services he would perform for the organization in these various roles.

Flamholtz then suggests several surrogate or operational measures of an individual's value to an organization (Flamholtz, 1971b, pp. 263-266). These include acquisition cost, replacement cost, current cost, compensation, and performance measures. These are described below, along with some of their advantages and disadvantages.

Acquisition Cost.

This is the traditional accounting measure for the value of a resource. It is viewed as reflecting the value to the purchaser of the resource at the time of purchase. Its advantages are that it is consistent with conventional accounting use and is reasonably feasible. However, the acquisition costs may have an unknown relationship to current value of a resource.

Replacement Cost.

This is simply the cost incurred in replacing a resource with another that could provide equivalent service.

Current Cost.

This is the current price for a resource bought and sold in an open market. One advantage is that both current and replacement costs seem more relevant for reflecting the present value of an individual than

does the acquisition cost, which reflects historical value. Flamholtz feels these measures are better for internal management use. Current cost reflects a normative value of an individual, while replacement cost represents the unique value of an individual to a single firm. One big disadvantage is that these kinds of measures are more difficult to obtain than the acquisition cost.

Compensation Measures.

These refer to the use of salary or commissions to indicate the value of an individual. Some advantages are that these figures are easily obtainable and have a high face validity. The price the organization is willing to pay for an individual's services would seem to be a valid measure of his organizational value. However, the disadvantages are that salary or commissions may not accurately reflect an individual's value because they are partially determined by extraneous factors such as traditional wage structures, organizational compensation policy, presence or absence of unions, etc. Flamholtz also feels that this kind of measure may not accurately reflect the present performance or the promotability of the individual.

Performance Measures.

Such measures refer to the individual's degree of achievement of the responsibilities in his present position and are synonymous with individual performance criteria. Aside from the normal problems encountered in trying to develop adequate job performance criteria, Flamholtz feels that such measures do not reflect the transferability (ability to perform in other roles) or promotability of an individual. Thus they are not fully reflecting the total value of an individual to the organization.

Dunnette, Milkovich, and Motowidlo (1973, pp. 27-34) also discuss and evaluate some of these HRA measures, especially as they apply to the military and they note that salaries and replacement costs are probably less relevant for military use than in private industry.

Other authors have proposed or used other measures of the value of individuals to an organization. Meltzer and Salter (1962), in their survey study of physiologists used: self-ratings of ability to keep up with the field, college grades, years between B.A. degree and Ph.D., and salary relative to age as measures of the ability of physiologists. Such measures could perhaps be construed as reflecting the relative value of an individual to the organization. Whitely and Frost (1971), contemplating research organizations, suggest nine possible measures of the value of organizational members: originality, ability to follow through ideas, energy, ability to collaborate with others in the organization, to collaborate with those outside the organization,

extent of formal training, loss to firm if member leaves, experience, and writing ability. Measures such as these fall in the second approach to measuring human resources value that Pyle outlined (using social-psychological measures, see above) and are very much within the systems model of organizational effectiveness.

Summary of Proposed Measures.

Dunnette et al. (1973) state that there are two basic approaches to measuring the value of human resources, that of assessing the costs of producing the resources, such as the replacement, acquisition, and current cost methods, and estimation of the present value of future expected performance. Both of these approaches, however, are subsumed under Pyle's approach of extending accounting concepts to human resources. Flamholtz's model, operationalized by his "surrogate" measures or by managerial estimations of the present value of future expected performance, seems to exhaust this approach.

Pyle's second approach, the use of social-psychological measures to assess the productive capability or value of human resources is represented by the use of Likert's intervening variables, mentioned above, and by the use of the long lists of other kinds of these measures, also presented above (Likert & Bowers, Meltzer & Salter, Whitely & Frost). However, these alternative measures proposed do not seem to fit easily into the approach using regular accounting concepts. For example, how does one convert a measure of an individual's originality into a replacement cost?

Finally, it should be reiterated that the variables mentioned by Likert as affecting individual productivity, absenteeism and turnover (i.e., satisfaction, morale, cohesion, and motivation, are viewed by some as a sort of "advance warning" variables. A drop in their value signals an ultimate decrease in organizational effectiveness (and profit), just as a rise signals an increase. Brummet, Flamholtz, and Pyle (1968) propose that such changes in these variables might be used to forecast earnings, and these predicted earnings could be discounted to determine the present value of the firm's human resources.

Operational Measures of Value of Human Resources.

The Michigan researchers have operationalized human resources accounting systems in an ongoing organization (Pyle, 1970). Pyle's article does not describe in detail how estimates of the value of human resources are arrived at, but it does describe rather well how this information is put into regular accounting systems and utilized by management for

planning purposes. The article's main value is a demonstration that a human resources accounting system apparently can be installed and utilized in an ongoing organization. It is a case study, however, and any conclusions which are drawn must be tentative.

A recent study (Dermer & Siegel, 1974) focused on the use of social-psychological variables. These authors pointed out that past suggestions about using such variables in accounting for human resources ". . . may appear to be only tentative suggestions, [but] there has been considerable effort made to persuade users of accounting data that this approach to producing relevant data is the wave of the future (p. 89)."

Dermer and Siegel first challenged Likert's systems model assertion that ". . . the behavioral health of an organization does determine its performance, and, hence, can be employed in accounting for human resources (p. 90)." Reviewing the available empirical evidence concerning the relationships of job satisfaction, motivation, cohesion, individual performance, absenteeism and turnover, they conclude that the relationship of individual performance to state or health variables such as motivation, satisfaction, cohesion may be other than what Likert and his followers believe. They state, "Given their contradictory results, it appears that the exact effect of behavioral variables in determining task performance is still to be established, and, hence, that the role such variables can play in accounting for human resources is very limited (p. 91)."

In their experiment, they instituted a Human Resources Accounting system into a business game in which sixty-five MBA students participated over a whole semester. The students received periodic feedback similar to that that would be received by an HRA system in a real organization. There were seven groups with each group competing against the others. The group's performance was measured in terms of sales, earnings, return on investment, and stock price. Questionnaire measures of motivation, satisfaction, effort, and group cohesion were taken six times throughout the game. Some of these questionnaire results were fed back to the students. These results made up the HRA feedback. The subjects also ranked eight organizational objectives when they filled out the questionnaire. Four of these related to the performance measures mentioned already, and four ". . . were related to an understanding of the processes that possibly determine task performance (p. 94)."

Logged, simultaneous, and leading correlations of measures of motivation, satisfaction, group cohesion, and satisfaction with performance were then computed. The results failed to support the views held by Likert and his associates. Few significant correlations were found, with fewer of these being sequenced in the direction assumed by

Likert than in the other direction. The authors conclude that their results ". . . should be interpreted as a need for caution rather than as an argument against the future development of HRA systems. To the extent that HRA is limited to advancing better cost accumulation and allocation schemata consistent with traditional practices, it is to be encouraged. Proceeding thusly, the difficulties encountered will be no worse than those already associated with traditional accounting practice. However, as this study has demonstrated, premature excursions into behavioral quagmires will do little to advance the contribution of accounting to improving organizational effectiveness (p. 97)."

Summary.

The belief that human resources are important and that it is worthwhile to calculate their value seems to be almost unanimously accepted. Exactly how to calculate this value is not viewed so unanimously. Two basic approaches, the extension of traditional accounting procedures to human resources and the use of state variables specified by a systems model of organizational effectiveness, have been advocated. Little empirical data exists.

Some Summary Comments

Organizational effectiveness as it has been defined and measured in the literature is an extremely untidy construct. When twenty-five separate variables can be identified and most of these variables have several different operational forms, life becomes rather difficult. This section owes its substantive content to the programmatic efforts of the Michigan researchers, the factor analytic attempts of a few other authors, and many other relatively isolated studies of one or two variables purporting to measure or predict organizational effectiveness. It is impossible to draw any safe conclusions about the interrelationships of these twenty-five variables based on the evidence before us. Most lines of research just have not been carried far enough. However, several things seem reasonably obvious about the domain of measures of organizational effectiveness as depicted in the above catalogue.

First, there are simply a lot of them and there have been precious few attempts to weed out the overlap and get down to the core variables; but this may be for good, if not sufficient, reasons. That is, within a particular "model" of the organizational effectiveness construct it is proper to demand such things as internal consistency, completeness, and parsimony for the dependent variables the model outlines. However, different people adhere to different models and there is no correct way to choose among them. Thus when putting together a list from different conceptual points of view, the composite list is almost preordained to look messy. It's something we have to live with, although eventually one must choose sides and decide upon the conceptual domain in which to operate.

Second, the entries in the catalogue vary considerably in terms of their generality/specificity and some may legitimately be subsumed under others. Again, it is probably possible to deal with this issue only within the context of a specific model of effectiveness. Some alternative methodological approaches to this problem will be discussed in the next section of this report.

Third, they vary considerably in terms of the methods used to operationalize them. Archival records, direct "on-line" recording, retrospective ratings by independent observers, and aggregated self-perceptions have all been used.

Archival measures are used relatively more often in this area of research than in many other areas of psychology. In this review, the variables Accidents, Growth, Absenteeism, Efficiency, Profit, Quality, and Turnover were measured almost exclusively by such measures. Overall Effectiveness and Productivity have been measured by both archival and subjective kinds of measures. As Webb, Campbell, Schwartz, and Sechrest (1966) point out, the advantage of using more than one mode of measuring a variable is the opportunity to determine the method variance in the measurement, thus obtaining a more accurate estimation of the variable's true value, and hopefully more insight about the variable itself. Although this particular area has probably seen much more such research than many others, more systematic use of multiple measurement models would be helpful. Several variables have been measured subjectively only, primarily by Likert-type ratings on a questionnaire or survey. These are Satisfaction, Morale, Motivation, Control, Goal Consensus, Role and Norm Congruence, and Information Management and Communication. Three other variables have been tapped primarily by subjective methods: Conflict/Cohesion, Managerial Task Skills, and Managerial Interpersonal Skills. Aside from Control, Satisfaction, and Managerial Interpersonal Skills these variables have been measured by methods that seem crude at worst and little researched at best. It appears that investigators sometimes feel that naming of a phenomenon and connecting it to a Likert scale of five to nine points was sufficient to insure adequate measurement. Seldom are reliability measures of any kind reported, though there are exceptions. It would be worthwhile to spend more time and degrees of freedom developing useful measures before using them in investigations.

A fourth general characteristic of these variables is that they vary on a continuum we might call closeness to the real payoff. For example, is morale the continuum on which the real payoffs are made or is it a means to an end? That is, is morale important because it is related to some more distal variable that is the organization's real concern? This is not precisely the same thing as Thorndike's

classic distinctions among immediate, intermediate, and ultimate criteria. Morale may indeed be the desired outcome of real interest and we could consider immediate, intermediate, and ultimate ways of measuring it. Rather, this distinction really points up several other issues. One is that the decision about which of these are means and which are ends is a value judgment on somebody's part. It is made implicitly or explicitly in organizations every day and cannot be avoided. Second, if the decision is that a particular variable is a means and not an end, is it necessary to demonstrate empirical relationships between that variable and the outcomes of real interest? Or should those relationships be assumed, since the outcomes of real interest are usually so difficult to specify and measure? It is precisely here that the goal model and the natural systems model diverge. Most theorists, researchers, and practitioners who adopt the natural systems point of view appear to accept the basic assumption that the systemic variables contained in their model are significantly related in a causal fashion to accomplishment of a variety of organizational missions. In contrast the goal model demands data.

In the best of all possible worlds it would be nice to have some overall hierarchical map of how the criteria fit together in terms of their generality/specificity and means/end relationships. Almost by definition such a map will be impossible to construct, except perhaps within the confines of a particular model of organizational effectiveness. Within this context a few systematic attempts at criterion organization have been made, and it is to these efforts that we now turn.

V. METHODOLOGICAL APPROACHES TO THE CHAOS OF DEPENDENT VARIABLES

Even a casual browse through the above catalogue begs the question of how one might attempt to determine the more "basic" structure of effectiveness that would allow the hierarchical, functional, and means/end relationships among these variables to be specified. In this section, we would like to consider briefly some alternative means for doing this and, where possible, to illustrate each approach with the major examples provided by the literature.

Traditional Multivariate Analysis

From the point of view of the industrial/organizational psychology criterion model, one obvious way to attack the problem is with some form of factor or cluster analysis. That is, an investigator could amass a large sample of similar organizations or independent organizational subunits, measure each one on all the variables listed in Table 5, obtain a matrix of empirical similarities (e.g., correlations) for all pairs of variables, and submit the matrix to a factor or cluster analysis. There are a number of variations of the basic factor and cluster analysis models (e.g., Weiss, in press) but a discussion of their differences would not be all that beneficial at present. What is worthy of note is that such an approach demands a large number of observations and reliable measures of each major facet of organizational effectiveness. If such conditions are satisfied then some clues as to the structure of effectiveness and its internal consistency can be obtained. However, we are still left with the often cited gaps which are inherent in the factor analytic approach. First, the picture of the more basic structure can be no better than the original sample of measures. The old adage of, "what comes out must go in" cannot be ignored and we did not encounter in the literature any systematic content sampling plan that tried to insure that a representative sample of criterion facets was being obtained. The problem is compounded when archival measures for such things as productivity are used. We have seen that such measures never seem to be defined the same way across organizations, which creates a number of interpretative problems. Second, if all the organizations or units being measured are not sampled from the same population we can not know the extent to which the factor or cluster solution is equally characteristic of each subpopulation. Third, on the basis of one factor analysis we do not know if the solution is dynamic or static and how much it might change over time (e.g., Ghiselli, 1956). Fourth, a factor or cluster analysis solution also gives no clues as to the relative importance of each factor.

There have been only two systematic attempts that we know of to use this methodology to search for the major factors comprising the dependent or criterion variables of organizational effectiveness. One of these was done at the University of Minnesota Industrial Relations Center by Mahoney,

Weitzel, and others (Mahoney, Frost, Crandall, & Weitzel, 1972; Mahoney & Weitzel, 1969) and the second is the well known effort by Seashore, Yuchtman, and others at the Institute for Social Research (Seashore & Yuchtman, 1967).

The Minnesota study used a questionnaire format to obtain ratings on the effectiveness of 283 departments or subunits sampled from over a dozen different firms. The ratings were made by managers at least one step removed from the direct management of the subunit, and the questionnaires included 114 items gleaned from the literature as being potential indicators of effectiveness. The correlations among the 114 items were factored and 24 effectiveness factors were labeled and defined. They are listed in Table 5.

TABLE 5

TWENTY-FOUR DIMENSIONS OF ORGANIZATIONAL EFFECTIVENESS, DERIVED FROM A FACTOR ANALYSIS OF RATINGS ON 114 EFFECTIVENESS CRITERIA FOR 283 ORGANIZATIONAL SUBUNITS. CRITERION VARIABLES WERE SELECTED FROM A LIST OF VARIABLES STUDIED IN ORGANIZATION THEORY LITERATURE, AND RATIONALLY DEVELOPED BY THE AUTHORS (FROM MAHONEY & WEITZEL, 1969).

Flexibility. Willingly tries out new ideas and suggestions, ready to tackle unusual problems.

Development. Personnel participate in training and development activities; high level of personnel competence and skill.

Cohesion. Lack of complaints and grievances; conflict among cliques within the organization.

Democratic supervision. Subordinate participation in work decisions.

Reliability. Meets objectives without necessity of follow-up and checking.

Selectivity. Doesn't accept marginal employees rejected by other organizations.

Diversity. Wide range of job responsibilities and personnel abilities within the organization.

Delegation. High degree of delegation by supervisors.

Bargaining. Rarely bargains with other organizations for favors and cooperation.

Emphasis on results. Results, output, and performance emphasized, not procedures.

TABLE 5 (Cont.)

Staffing. Personnel flexibility among assignments; development for promotion from within the organization.

Coordination. Coordinates and schedules activities with other organizations, utilizes staff assistance.

Decentralization. Work and procedural decisions delegated to lowest levels.

Understanding. Organization philosophy, policy, directives understood and accepted by all.

Conflict. Little conflict with other organization units about authority or failure to meet responsibilities.

Personnel planning. Performance not disrupted by personnel absences, turnover, lost time.

Supervisory support. Supervisors support their subordinates.

Planning. Operations planned and scheduled to avoid lost time; little time spent on minor crises.

Cooperation. Operations scheduled and coordinated with other organizations; rarely fails to meet responsibilities.

Productivity-support-utilization. Efficient performance; mutual support and respect of supervisors and subordinates; utilization of personnel skills and abilities.

Communication. Free flow of work information and communications within the organization.

Turnover. Little turnover from inability to do the job.

Initiation. Initiates improvements in work methods and operations.

Supervisory control. Supervisors in control of progress of work.

Note.-From T. A. Mahoney and W. F. Weitzel, Managerial model of organizational effectiveness. Administrative Science Quarterly, 1969, 14, 357-365.

Each subunit was also rated on "overall effectiveness" and a major additional step was to compute a multiple regression equation regressing the 24 factors against the overall rating. The regression analysis was done for different types of subunits, for organizations of different sizes, and for organizations employing different technologies. In general, the factors which account for

greatest variance in the overall effectiveness rating are not the same across the various breakdowns of the total sample of subunits. That is, the composition of overall effectiveness is different for production vs. R & D units, for mass production, first unit production, etc.

The effectiveness dimensions identified by the ISR group in a factor analytic study of the performance of 75 insurance agencies are shown in Table 6.

TABLE 6

TEN DIMENSIONS OF ORGANIZATIONAL EFFECTIVENESS DERIVED FROM PRINCIPAL COMPONENT ANALYSIS AND VARIMAX ROTATION OF SCORES ON 76 PERFORMANCE VARIABLES FOR 75 LIFE INSURANCE AGENCIES. PERFORMANCE MEASURES WERE SELECTED FROM A LIST OF SUCH CRITERIA USED BY PARENT COMPANY TO ASSESS AGENCY EFFECTIVENESS (FROM SEASHORE & YUCHTMAN, 1967).

1. Business volume. Expresses different aspects of organization size in respect to manpower and to number and value of policies sold.
2. Production cost. Efficiency of sales, production process; cost per unit of sales volume.
3. New member productivity. Productivity of members having less than 5 years tenure with agency.
4. Youthfulness of members. Relative frequency and productivity of members under 35 years of age.
5. Business mix. A combination of three conceptually unrelated performance indices, interpreted as reflecting the ability of agencies to achieve high overall performance through any of several strategies.
6. Manpower growth. Relative and absolute change in manpower levels.
7. Devotion to management. Sales commissions earned by agency managers, high commissions are interpreted as reflecting high interest in sales and corresponding low interest in management activities.
8. Maintenance cost. Efficiency of administration of manpower, plant, and established customer resources.
9. Member productivity. Average new business volume per agent.
10. Market penetration. Proportion of potential market that is being exploited.

Note.-From S. E. Seashore and E. Yuchtman, Factorial analysis of organizational performance. Administrative Science Quarterly, 1967, 12, 377-395.

The basic data for this Michigan study were not questionnaire responses or subjective ratings but consisted of archival records of sales and personnel data. The nature of the business which was studied makes it hard to generalize these results but a number of findings are suggestive. For example, relative to the "devotion of management" factor one could ask how much time a squadron commander spends flying vs. managing.

Based on their own data and related experiences, Seashore (1972) has drawn several negative "morals" concerning effectiveness criteria. To wit:

1. If several raters are asked to rank order a number of organizations or organizational subunits in terms of their overall effectiveness the interrater agreement is usually quite low. Unless they are all of extremely like mind, different raters tend to focus on different facets when making their judgments.
2. In the real world criterion measures sometimes correlate negatively when they aren't supposed to.
3. In the real world so-called hard data or "objective" criterion measures usually turn out to be quite "soft". No one needs to be reminded that in almost all cases any number of artifacts and biases operate to water down the fidelity of objective measures such as profit, costs, turnover and retention rates, number of missions flown, etc. There is no refuge in objectivism.
4. In the real world it is probably a mistake to think of effectiveness criterion variables, regardless of how many there are or at what level they are, in terms of continuous and linear functions. For example, higher and higher retention rates may be "good" up to a point and then become "bad". Notice the perspiration that begins to flow when we ponder the implication of the words good and bad.

Hierarchical vs. Non-Hierarchical Solutions

So far we have been considering multivariate analyses of multiple criteria in terms of a non-hierarchical, factor analytic model. We found no research that attempted to determine directly the hierarchical relationship among a representative set of criterion variables.

The relationships among criteria could be hierarchical in perhaps two basic ways. One kind of hierarchical arrangement would be a functional one. That is, the measures at one level are simply composites of measures at some lower level and the basic functional properties of the variables are retained as one goes up the hierarchy. They are simply aggregated into larger and larger "hunks" which then must be given somewhat different (i.e., broader) definitions. In a sense, the arguments over the meaningfulness of a variable

labeled "total performance" (e.g., Dunnette, 1966; Schmidt & Kaplan, 1971) is an argument about whether a two level hierarchical model is appropriate. Mahoney and Weitzel implied such a two level model was appropriate when they sought to determine via regression analysis the functional role of their individual criterion variables in accounting for the variance in the overall performance of a unit.

A second way to look at a hierarchical arrangement is in terms of the cause and effect relationships that exist, if any. For example, we could worry about whether morale is causally related to quality of production, or vice versa. This is a critically important set of considerations since it gets at the heart of the difference between the goal and systems models of organizational effectiveness. If the causal or means/end relationship could be specified, we could go a long way toward reconciling these two points of view.

Short of actual experimentation, naturally occurring or otherwise, there are few methodological tools available to the investigator interested in causality. Nevertheless, multivariate techniques have been applied to the causality question and we would like to discuss them briefly.

Path Analysis

If the aim of the investigator is to say something about the causal relationship among criterion variables in the hopes of teasing out the means/end relationships, one way to proceed is via path analysis. Although the method is not new, the application of path analysis to social science data is a relatively recent occurrence and had not been talked about much before 1966-69 (Duncan, 1966; Heise, 1969; Land, 1969). Its introduction to social science was primarily a courtesy of the sociologists but its application to psychological research problems has also been advocated (Werts & Linn, 1970). A specific example of how path analysis can be used to delve into the relationship among organizational characteristics is provided by Aldrich (1972), Hilton (1972), and Heise (1972) in a special issue of the Administrative Science Quarterly. The following brief discussion of path analysis is meant to reflect the issues identified in these latter papers.

In essence, path analysis is a multivariate correlational technique that attempts to test whether a specific prior hypothesis about the direction of relationship between two variables is a reasonable one. The basic statistic is the semi partial correlation coefficient and the method is subject to all the constraints which the use of that statistic implies.

To begin, the investigator must have in hand data on at least three variables. Even with just three variables there are a large number of causal arrangements that are possible. For example, two variables in the set (a) may not be related at all, (b) they may be related but not in a causal way, or

(c) they may exhibit a causal relationship that may go one way or the other. If we consider all the possibilities of causal orderings for three variables there are a total of 18. Three of these are shown in Figure 1.

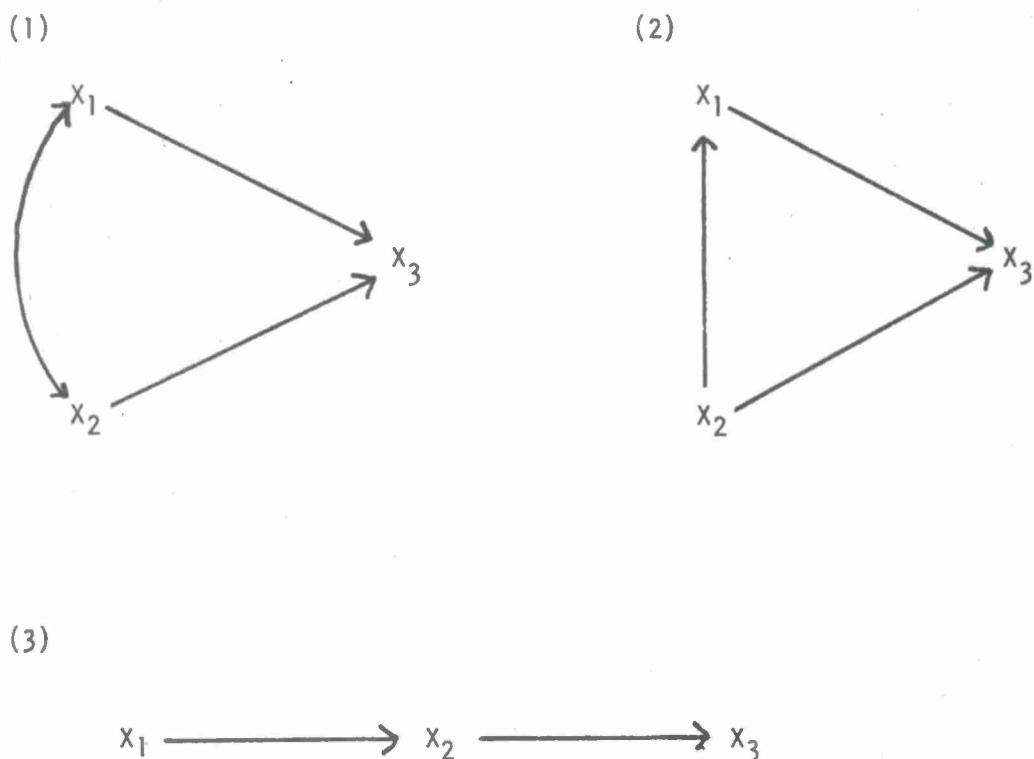


FIG. 1. Three of 18 possible causal orderings for three variables.

By convention a straight, solid line, unidimensional arrow signifies a causal relationship between two variables. A curved two headed arrow signifies an association between two variables, but no causal relationship. The magnitude of the hypothesized causal relationship is referred to as a path coefficient which is the semi partial correlation of the causally prior variable with the "dependent" variable. It is computationally the same as a standardized multiple regression coefficient. For example, the coefficient for the path $X_1 \rightarrow X_3$ in the first example above, is the correlation between X_3 and the residual in X_1 after the association with X_2 is partialled out.

For a path analysis to be useful, certain conditions must be met. First, the investigator must specify what he or she believes the actual arrangement of causal relationship to be. Competing "theories" about the linkages could also be specified. Further, the causal model used by the experimenter must match the constraints imposed by the path analysis model. These are:

1. All relationships are linear.
2. The effects of different variables are additive. Interactive effects are not allowed.
3. Residuals for all pairs of variables are uncorrelated. Thus if an unmeasured variable accounts for variance in the residuals of more than one variable in the system, the model is violated.
4. Measurement is on an interval scale.
5. Relationships are recursive. That is, no feedback is assumed to occur and two-way causality is not allowed.

If these conditions are reasonably met then what path analysis does is to permit the investigator to conclude that a specific prior theory (i.e., a specific path arrangement) is either no good or that it is still a reasonable explanation of the data. That is, the data can reject a specific explanation, but in no way can they conclusively support one. Thus the informational content of the method is related to the extent to which clear competing a priori explanations can be formulated and the extent to which data have a chance to reject one or more of them. The power of path analysis is attenuated to the extent that there is measurement error and sampling error in the system and to the extent that competing explanations are not clearly differentiated.

The basic procedure is to use the a priori path specifications to predict whether the regression coefficient for a specific path should be zero or significantly greater than zero. Empirical data can then be used to test these predictions. If the competing models being examined are conceptually distinct they will predict a different pattern of zero and non-zero beta coefficients.

An example of using path analysis to examine relationships among organizational characteristics is provided by Franklin (1973). Using data accumulated at the Institute of Social Research from 37 research sites, a subset of 184 organizational units from 10 sites was selected. The four variables under study were: (a) organizational climate, (b) managerial leadership style, (c) peer leadership style, and (d) group process characteristics. Each of these four variables is a composite of a number of questionnaire items and the raw data consist of perceptions by organization members. The instrument used to collect these data will be discussed in detail in the next chapter. Scores on these four composite variables were obtained at two points in time and from samples of individuals at several hierarchical levels. In addition to path coefficients between two different variables, predictions were then made about the path coefficients between a particular variable measured at two different times, or at two different organizational levels. That is, an attempt was made to predict the causal

relationship across time and across levels as well as among variables. For example, does the organizational climate at level 4 influence the kind of leadership style employed at level 3, or vice versa?

One can appreciate that considering 4 variables, 5 levels, and 2 times quickly leads to a complicated set of possible relationships. Nevertheless, if we want to understand the causal relationships among these variables we have to jump in someplace. Path analysis forces the investigator to at least think about all the relevant issues. It's a difficult and sobering experience.

Franklin's prior model concerning these four variables posited that organizational climate influences managerial leadership style which in turn influences peer leadership behavior which in turn influences the nature of group processes. For the data obtained within one organizational level at time one the model received a certain amount of support, although at least one other alternative could not be easily rejected. The data also suggest that organizational climate becomes a more potent determinant of managerial leadership style at lower levels of the organization, and that in turn, the best predictor of organizational climate is organizational climate at a previous time period.

In sum, the Franklin study illustrates many of the virtues and many of the pitfalls of path analysis as it might be applied to an analysis of measures of organizational functioning. It does force the investigator to come to grips with the means/end question, since for the analysis to get off the ground, the investigator's best guess as to the causal ordering must be specified. On the negative side the number of linkages can quickly get out of hand and if the variables in the system are not well defined and reliably measured, the interpretation of the results becomes difficult.

Criterion Organization Via Expert Judgment

So far, the methods we have discussed for examining the functional and means/end relationships among criteria of organizational effectiveness have been empirical in the sense that a reasonably large sample of organizations or subunits actually had to be measured on each of the variables. Another way to proceed would be to utilize the judgment of experts concerning how the various criteria are functionally or causally related.

There are perhaps three general approaches to the use of expert judgment for this kind of criterion analysis, although few of them have ever been used in the organizational effectiveness context and we have no data to cite. We have labeled these the (1) direct judgment, (2) indirect judgment, and (3) critical incident methods. With all of these methods, the question of who judges is paramount. There is no straightforward answer to this question except to say that in any situation there are probably several groups of individuals who might have different perspectives or expertise to

offer and it would be well to solicit judgments from as many different sets as possible. Systematic differences between groups of judges might well reveal important differences regarding the value systems that operate in an organization and these differences should be explicitly announced when found.

Direct judgment. We could, in so many words, ask a panel of judges to do things like the following.

1. Ask the judges to rate the importance of each criterion in terms of its contribution to a determination of overall effectiveness. To make the rating task feasible, the context of the judgment would have to be specified in a systematic way. For example, are we engaged in a full scale global war? Is it peacetime? Is the budget being cut severely? To further specify the context, the instructions for the judges might be to think of overall effectiveness in terms of the continuum on which he would rank a sample of organizations (e.g., ships) if he had to keep some and disband the others. In essence the task would be to define the overall continuum as clearly as possible, define the individual measures as clearly as possible, and then ask the judges to rate the importance of each individual measure. Thurstone type considerations of interrater agreement, etc., would then apply.
2. Ask the judges to rate the similarity among measures. That is, for every pair of variables, to what extent would the judges expect them to covary (e.g., If a ship scores this way on X, how will it score on Y?). Such judgments could then be subjected to multivariate analysis like any other covariation matrix.
3. Ask the judges to rate the extent to which each variable is a consequence of each other variable. A number of interesting scaling problems emerge from such a question. For example, something analogous to paired comparisons could be used to rate the extent to which A (e.g., quality of production) is a consequence of B (morale) and the extent to which B (morale) is a consequence of A (quality of production).

Indirect judgment. There are a number of indirect ways one could go about obtaining the above kinds of judgments. All of them are dependent on being able to construct a large sample of hypothetical organizations for which the "scores" on the various criteria are systematically varied. The number of hypothetical examples required is a direct function of the number of criteria under consideration and the number of levels of each with which we wish to deal.

Given that we have a representative sample of descriptions of hypothetical organizations that differ systematically on a set of criterion measures, the following kinds of tasks could be set up for relevant groups of judges. Again, different sets of judges may bring different perspectives and it would be worthwhile to use several groups.

- A. One task for the judges would be to have them judge the "similarity" of each pair of organizations using some form of paired comparisons procedure. Multi-dimension scaling procedures (e.g., Shepard, Romney, & Nerlove, 1972) could then be imposed on the similarity judgments to determine the number of recognizable "clusters" of organizations that emerged. The characteristics of the organizations in each cluster could then be examined for the purpose of determining the criteria most salient for each cluster. Supposedly, these would be the variables composing a major component of effectiveness. If effectiveness is indeed unidimensional (i.e., if it is perceived to be so) then all the organizations should array themselves on a single dimension.

Varying the instructions for the similarity judgment could be a valuable source of information. For example, we think that valuable insights could be gained by asking for judgments in terms of which of two organizations is more effective (vis-a-vis some very general or more specific mission statement) and which is more ineffective. The two judgments are probably not symmetrical and it would be valuable to know what criterion variables characterize the asymmetry.

- B. A similar procedure could be used if it were possible to assemble a sample of real organizations with which a set of judges would be reasonably familiar. Paired comparisons again could be used to obtain judgments of "similarity", "relative effectiveness", and/or "relative ineffectiveness". A multidimensional scaling model could again be used to recover the major dimensions underlying the judgments. Identifying the relevant characteristics of the organizations clustering on each dimension would be a matter for additional research. Notice that in this case the investigator would not be limited to an a priori list of variables (such as discussed in the previous section) with which to characterize the organizations in each cluster. The characteristics identifying each cluster would be searched for "after the fact". Such a procedure has some obvious advantages and disadvantages. Variables not in the original list, but which are important determinants of the similarity judgments can be identified. However, the investigator also runs the risk of considering certain variables to be more highly characteristic of a cluster than they really are. That is, the investigator may see more distinctions than are actually there.
- C. In addition to the question of the dimensionality of organizational effectiveness or organizational ineffectiveness, indirect judgments can also be used to study the relative importance of each effectiveness criterion factor. Recall that Mahoney and Weitzel (1969) did this empirically by first obtaining ratings of real organizational units on overall performance or on a number of specific performance factors. Multiple regression was then used to determine the contribution of each component to overall performance. A similar procedure could be used if it were possible to assemble representative descriptions of hypothetical organizations.

Again, the value of these kinds of data could be enhanced if a number of meaningful alternative definitions of overall effectiveness could be developed and the procedure repeated for each.

Critical incident methodology. Another judgmental procedure that could be used to help impose some conceptual order among the possible components of organizational effectiveness is the critical incident methodology developed in the context of individual performance (e.g., Campbell, Dunnette, Arvey, & Hellervik, 1973; Smith & Kendall, 1964). This procedure is too well known to be discussed in detail but the general procedure might run something like this.

After being familiarized with the procedure, groups of judges would be asked to generate specific examples of something that happened in their organization which caused them to think that the organization was performing in an effective or ineffective manner. This is analogous to asking for descriptions of examples of effective and ineffective job performance on the part of individuals. The usual questions about which set of observers should generate critical incidents and whether the incidents should be recorded as they happen or described in retrospect, apply here as well. Again we would argue that using different sets of observers (e.g., enlisted men, junior grade officers, senior officers, etc.) and different methodologies would be a source of valuable comparative data.

The second step would be to use another set of judges to carry out a qualitative "cluster analysis" of the incidents (as in Campbell, et al., 1973) in an attempt to identify the major components of effectiveness represented by the incidents. These tentative effectiveness dimensions could then be discussed at length by the relevant parties so as to refine and complete their definitions as thoroughly as possible. To further check on the understandability of the factors, Smith and Kendall's (1963) retranslation step could be carried out as a next step.

A procedure such as this represents a logical analysis by people in the organization of the specific "bits" of the total domain of organizational effectiveness which were sampled by the critical incident technique. The list of variables produced by this procedure could then be compared to lists of criteria such as that presented in the above catalogue. If there are significant discrepancies, the people in the organization could be questioned further as to what the reasons might be for the lack of critical incidents in a particular area.

Summary of Criterion Analysis Methods

We have discussed a number of ways an investigator could go about trying to impose some order on the plethora of dependent variables that were catalogued in the previous section of this report. We would like to make the following concluding remarks.

- . In general the methods fall into two general classes, those which require that a large sample of organizations be measured on each variable and those which use expert judgment to impose a logical order. Both methods have their advantages and disadvantages and it would not be in our best interests to label one or the other as more correct. Further they are not always addressed to the same questions and provide somewhat different kinds of information.
- . The number of instances in which any systematic approach has been used to address the organizational effectiveness problems of (a) criterion dimensionality, (b) relative importance, and/or (c) causal ordering is pitifully small. The fingers of one hand are sufficient to count them.
- . For the most part, methodological approaches such as those described above make the implicit assumption that the criterion structure which results can be applied across many organizations. This is directly true of the empirical techniques but not quite so true of the judgmental techniques which could sample judges from whatever subset of organization that was desired. However, the management by objectives (MBO) model of organizational effectiveness would reject all such studies of criterion structure. The MBO procedure is firmly rooted in the notion that the effectiveness of an organization is to be judged against the set of specific and concrete objectives that it wants to accomplish, and each organization may have a unique set of objectives.

VI. ORGANIZATIONAL CLIMATE

There are a number of organizational characteristics that perhaps qualify neither as an independent variable nor as a dependent variable. Rather they are characteristics which give an organization its recognizable form. They are variables which describe the structure of the organization and its processes and which together distinguish it in form from other organizations. It is these sorts of variables which have been used by a number of people to develop typologies or taxonomies of organizations (e.g., Blau & Scott, 1962; Etzioni, 1961; Hall, 1972; Woodward, 1965).

For our purposes, the two main classes of such variables that are of interest are organizational climate and organizational structure and we will discuss them in turn. The potential role of these variables is as "moderators" or "intervening" variables between the manipulation of an independent variable and the observation of a change in a dependent variable. However, some of the variables included in this section could, in certain contexts, be considered either as independent or dependent variables. For example, the structure of an organization may appear to be a given in one context but in another it is a variable to be manipulated. Also, certain facets of what many investigators refer to as organizational climate, may at times be regarded as a dependent variable, or measure of effectiveness. These issues should become clearer as our discussion progresses.

Definitions of Organizational Climate

Organizational researchers have long discussed the influence of the environmental setting on behavior. As the organization whose behavior is being studied becomes more complex, the range of potentially important environmental factors increases, and so does the number of alternative ways of arranging these factors. Theories of environmental impact on human behavior vary in the complexity of the relationships that are hypothesized to exist between the environment and behavior.

In the simplest form, researchers assume all people will react uniformly to certain environmental changes. For example, it was proposed early in the Hawthorne studies (Roethlisberger & Dickson, 1939) that lighting and other environmental improvements would lead to improved performance. Actual environment-behavior relationships turned out to be more complex.

An interactive approach (e.g., Sells, 1963) contends that behavioral outcomes are joint functions of the environment and the personality structure of the individual. This viewpoint is best illustrated by the "fit" or "match" hypotheses which propose that performance or satisfaction is a function of the degree of fit between individual needs or abilities and environmental characteristics (e.g., Andrews, 1967; Pace & Stern, 1958).

Finally, a transactional viewpoint (Pervin, 1968) proposes a dynamic reciprocal influence between the individual and those components of his environment which impinge upon his behavior. Thus, both the individual and his environment are changing as a result of a mutual influence, and behavior is a joint function of the two changing elements.

Cutting across these three complexity levels, there have been two major theoretical/methodological traditions for defining climate. Sells (1963) typifies one position in stating that "measurement of situational factors would be based on objective observation of the stimulus situation external to the participatory individual.... [I]f important interaction effects between individual and situational factors are to be studied, the situational measures must be obtained independently of the individual's perception of them (p. 7)." Other authors (Litwin & Stringer, 1968; Taguiri, 1968) explicitly define climate as a perceived phenomenon. According to this model, since it is people's perceptions of the environment which influence their behaviors, the best way to assess the environment is to tap those perceptions directly. The most common strategy is to employ subjective rating scales and to emphasize in the instructions that the rater is to describe his organization as it actually is, not to evaluate it as favorable or unfavorable. The object is to obtain a view of the organization as it is perceived by its members and thus as it impinges upon their behaviors. All too frequently, this position is adopted purely for the simple methodology it affords but it does exist as a valuable theoretical position as well.

The final variable in definitions of climate is the range of factors included in the assessment. In providing an incredibly extensive list of situational variables potentially affecting behavior, Sells (1963) establishes the impracticality of accounting for all environmental factors. Every researcher implicitly or explicitly selects a limited number of climate dimensions to be assessed. One tendency is to restrict climate to human or social variables and omit or treat separately characteristics of the physical environment or formal aspects of the organization per se. Thus, Schneider and Bartlett (1968) developed their Agency Climate Questionnaire from items bearing on "the human characteristics of the organization, a combination of what managers do in agencies, what agents do in the agencies, how people are treated, and what kinds of people are in the agency (p. 323)." Although Halpin and Croft (1962) cite nine dimensions of an elementary school environment, including physical plant, student, parent, and teacher characteristics, and administrative policies, they limited their climate instrument to social interactions among faculty and staff.

Pugh, Hickson, Hinings, MacDonald, Turner & Lupton (1963) differentiate between climate and structure as environmental elements affecting behavior. Structural factors refer to the extent to which organizational behaviors are prespecified, standardized, structured or imposed on organizational members, and include the degree of formal restrictions

on communications and participation within the organization. The structural characteristics of the organization develop from decisions made by those controlling organizational resources, and depend in part on the size and technology of the organization (e.g., Woodward, 1965). *

Climate is "a molar concept reflecting the content and strength of the prevalent values, norms, attitudes, behavior, and feelings of the members of a social system" (Payne & Pugh, in press). Climate is thus a result of the transaction between individual members, with their idiosyncratic needs, abilities, and goals, and the organizational structure. Both structure and climate may be assessed either objectively or through member perceptions.

Structure is typically given one of two meanings in the research and theoretical literature. One viewpoint is exemplified by Porter and Lawler (1965), who discuss the effect of such characteristics as size, span of control, and number of hierarchical levels on member performance and satisfaction. This viewpoint might be characterized as a physical component of structure. The alternative, embraced by Pugh et al. above, defines structure as the degree to which member activities are structured or controlled within the organization. Degree of bureaucratization (Hall, 1963; Weber, 1947) is a closely related concept and both refer primarily to the amount of behavioral or ideological structure imposed.

Climate Instruments: Educational Climate

Organizational climate research has been conducted more or less independently in two distinct fields: education, and profit centered business organizations. The major exception is Stern who has developed several parallel climate instruments, three for assessing colleges and high schools and one, the Organizational Climate Index, for general organizational applications. In addition, Halpin and Croft's (1962) Organizational Climate Description Questionnaire, although created to measure elementary school climate, is not conceptually restricted to educational settings, and Friedlander and Margulies (1969) have used a slightly modified version of the OCDQ in assessing the climate of a business organization.

The measures most frequently used for studying educational environments are Stern's College Characteristics Index, Pace's College and University Environment Scales, Aston and Holland's Environmental Assessment Technique, Pervin's Transactional Analysis of Personality and Environment, and Halpin and Croft's Organizational Climate Description Questionnaire. Perhaps the most extensive is the College Characteristics Index (CCI) (Stern, 1970; Pace & Stern, 1958) which is designed to assess environmental press on 30 of Murray's needs (see Figure 2).

FIGURE 2
NEED AND PRESS SCALES ASSESSED BY STERN'S CCI

1. Aba Abasement-Ass Assurance: self-depreciation versus self-confidence.
2. Ach Achievement: striving for success through personal effort.
3. Ada Adaptability-Dfs Defensiveness: acceptance of criticism versus resistance to suggestion.
4. Aff Affiliation: group-centered social orientation.
5. Agg Aggression-Bla Blame Avoidance: hostility versus its inhibition.
6. Cha Change-Sam Sameness: flexibility versus routine.
7. Cnj Conjunctivity-Dsj Disjunctivity: planfulness versus disorganization.
8. Ctr Counteraction: restriving after failure.
9. Dfr Deference-Rst Restiveness: respect for authority versus rebelliousness.
10. Dom Dominance-Tol Tolerance: ascendancy versus forbearance.
11. E/A Ego Achievement: striving for power through social action.
12. Emo Emotionality-Plc Placidity: expressiveness versus stolidness.
13. Eny Energy-Pas Passivity: effort versus inertia.
14. Exh Exhibitionism-Inf Inferiority Avoidance: attention-seeking versus shyness.
15. F/A Fantasied Achievement: daydreams of extraordinary public recognition.
16. Har Harm Avoidance-Rsk Risktaking: fearfulness versus thrill-seeking.
17. Hum Humanities, Social Science: interests in the humanities and the social sciences.
18. Imp Impulsiveness-Del Deliberation: impetuosity versus reflection.
19. Nar Narcissism: vanity.
20. Nur Nurturance: helping others.

21. Obj Objectivity-Pro Projectivity: objective detachment versus superstition (Activities Index) or suspicion (Environment Indexes).
22. Ord Order-Dso Disorder: compulsive organization of details versus carelessness.
23. Ply Play-Wrk Work: pleasure seeking versus purposefulness.
24. Pra Practicalness-lpr Impracticalness: interest in practical activity versus indifference to tangible personal gain.
25. Ref Reflectiveness: introspective contemplation.
26. Sci Science: interests in the natural sciences.
27. Sen Sensuality-Pur Puritanism: interest in sensory and aesthetic experiences versus austerity or self-denial.
28. Sex Sexuality-Pru Prudishness: heterosexual interests versus asceticism.
29. Sup Supplication-Aut Autonomy: dependency versus self-reliance.
30. Und Understanding: intellectuality.

Note.-From Stern, 1970.

The instrument consists of 30 scales, with 10 items per scale. Items are statements describing a college environment high in the related press which are rated by students as true or false of their school. Schools can be described either in terms of mean scores on each of the 30 press scales, or in reference to scales derived from factor analysis of individual responses to CCI items. Stern (1970) describes 11 factors generated from a normative sample of 1076 students in 23 schools and colleges:

Aspiration level - expectation that students will set high goals

Intellectual climate - devotion to scholarship in humanities, arts, and social sciences

Student dignity - degree of student autonomy and self determination

Academic climate - emphasis on academic excellence in humanities and physical sciences

Academic achievement - press for high student achievement

Self expression - opportunity to develop leadership ability and self assurance

Group life - incidence of mutually supportive group activities

Academic organization - emphasis on organization and structure in the environment

Social form - press for "proper" social behavior

Play vs. work - party atmosphere

Vocational climate - press for practical and conservative activities

High scores for a college on these dimensions indicate either active pressure to behave in the prescribed way, or the opportunity for related activities and hence on implicit press for the dimension.

Stern (1970) presents data indicating large differences in the score profiles over these 11 factors for six different types of colleges. Independent liberal arts schools are characterized as highly intellectual, denominational schools are socially oriented with low stress on academic achievement, and university liberal arts colleges are principally noted for their emphasis on play rather than work. Business administration schools emphasize practicality over intellectual activities, engineering colleges are high in press for grades and academic aspirations, and teacher's colleges appear to be generally undifferentiated from normative mean data except for a rather low emphasis on grades.

Stern's most informative measure of college environment is the score on a second order CCI factor, Intellectual Climate. This dimension includes positive loadings from the first 6 first order factors and negative loadings for the last two factors. According to Stern, Intellectual Climate defines the quality of staff and facilities, level of achievement standards, opportunity for student self-development and self-responsibility, and an absence of vocationalism. Intellectual Climate scores correlate highly (greater than .70) with Scholastic Aptitude Test verbal scores, National Merit Scholarship Qualifying Test total scores, and percentage of graduates later receiving Ph.D.'s, although the correlation with SAT mathematics scores is relatively low (.34). The scale selects a set of small, "exclusive", liberal arts colleges with high achievement press and an emphasis on work rather than play. Students at high intellectual climate schools are characterized as holding higher than usual intellectual interests, and lower social and dependency needs. Viewed in the above manner, this variable almost begins to take on the appearance of a dependent variable.

Stern also reports another second order factor of Non-intellectual Climate with high factor loadings from factors representing institutional supportiveness and vocational emphasis. The former component may be interpreted as a protectiveness press or philosophy of in loco parentis on the part of the school. Vocational climate is highly related to a play vs. work atmosphere, and is somewhat tangential to the Non-intellectual Climate factor.

In evaluating need-press fit, Stern gives an interpretation to the difference between individual responses to the CCI and responses to the Activities Index (AI), his personality need measure. AI responses and expected college climate from the CCI were obtained for incoming students and compared with each other, and with mean CCI data for current students. Large differences are taken to indicate potential problems. The student may be referred for counseling to produce more accurate expectations, may be channeled into special programs more congruent with his needs, or presumably may be advised to transfer. The same model of individual-organizational "fit" would be applicable to almost any organization.

Stern (1970) reports a study by Cohen (1963) in which 12 AI factor scores were intercorrelated with 11 CCI factor scores for 55 institutions and the intercorrelation matrix factor analyzed. The resulting five factors shown in Figure 3 are interpreted as comprising an institutional culture -- a combination of environmental press elements and the influences of the particular types of people who attend the school. These factors represent Stern's most comprehensive definition of educational climate.

FIGURE 3
AI-CCI NEED-PRESS INSTITUTIONAL CULTURE FACTORS, AND
COMPONENT NEED AND PRESS DIMENSIONS (FROM STERN, 1970, pp. 205-210).

- I. Expressive culture: Large positive loadings from Expressiveness, Sensuousness, and Friendliness need factors; negative loadings from Applied Interests need dimension, and Vocational Climate press factor. Institutions are aesthetic, gregarious, and non-practical, with high scores in femininity. Low scoring schools are characterized either by high Constraint vs. Expressiveness or by masculinity and applied interests.
- II. Intellectual culture: Large positive loadings for Intellectual and Achievement related needs, and for Aspiration Level, Academic Climate, Intellectual Climate, Self Expression, and Academic Achievement CCI factors. Negative weight for Vocational Climate. This factor is very similar to the second order CCI factor of Intellectual Climate.
- III. Protective culture: Large positive loadings for Submissiveness, Orderliness, Sensuousness, and Dependency need factors, and Group Life, Social Form, and Academic Organization press factors. Negative loadings for Audacity and Assertiveness need areas. Protective institutions are characterized by a highly organized, dependent, submissive student body; a large proportion of high scoring schools are denominational women's colleges.
- IV. Vocational culture: Large positive loadings from Egoism and Self Assertion need factors, and Vocational press. Schools are

FIGURE 3 (Cont.)

characterized by an emphasis on conservatism and pragmatism, and students who are achievement oriented, socially dominant, and somewhat egocentric.

- V. Collegiate culture: Large positive loadings for Friendliness and Self Assertion need factors, and for Play and Social Form press factors. Negative weights for Student Dignity, Academic Achievement, and Academic Organization. The collegiate institution is oriented toward amusement, especially through social organizations, and provides custodial care for its students, relieving them of personal responsibility.

The Intellectual and Protective factors correspond fairly well to the two CCI second order factors, while the personality factors apparently seemed to split Expressiveness away from the CCI intellectual dimension, and to separate the Vocational and Collegiate (play) dimensions from each other and from the CCI control factor.

Stern (1970) found that inter-institutional differences were best illustrated by their differential scoring patterns on these 5 culture dimensions, while individual need-press fit was best assessed on the basis of individual scores on the original 12 AI and 11 CCI dimensions.

Stern's interactive climate model predicts that individuals who have needs that are matched by a strong corresponding environmental press will exhibit better performance and greater satisfaction than students experiencing a poor fit with their environment. The main fault of the need-press model is the low correspondence between empirical structures found for individual need and organizational press measurements. If personality and press configurations are not similar, it is difficult to explain precisely how the two will interact to affect behavior. Stern (1970) presents the results of a factor analysis of 30 need and 30 press scales. Of 12 first level need and 11 press factors, only two pairs of factors from the two sets appear reasonably comparable, indicating relatively dissimilar factor structures underlying the two measures. However, this result is not quite as conclusive as it seems, since the second order factors for need and press scale responses are considerably more similar. Stern's Activity Index and the CCI are measuring the same broad areas, but they break them down differently. It is not particularly clear what this implies for the need-press model, except perhaps that only very general predictions can be made for the effect of a given environment on an individual. If a person's more specific perceptions of environmental press are arranged differently than his perceptions of his needs, it is difficult to predict his satisfaction in the environment.

Pace's College and University Environment Scales (CUES) (Pace, 1968; Stern, 1970) was developed from the CCI. A factor analysis of institutional means on the 30 CCI press scales produced the 5 factors shown in Figure 4.

FIGURE 4
THE COLLEGE AND UNIVERSITY ENVIRONMENT SCALES^a

1. Scholarship: perceived environmental press for academic achievement; selectivity of the institution; importance of getting acceptable grades.
2. Awareness: perceived press for self expression; artistic orientation; intellectual press.
3. Community: perceived press for social activities; affiliation with faculty and other students.
4. Propriety: press for social conformity; constraint; deference to tradition.
5. Practicality: emphasis on vocationalism; applied orientation.

Note.-From Pace, 1968.

a. All scales have 30 True-False descriptive statement items.

Items were selected to measure these 5 dimensions on the bases of their factor loadings, the apparent relevance of their content for the factor, and their ability to discriminate between schools scoring high and low on the factor scores. The result was a 150 true-false item instrument with 30 items per scale. An item is scored positively if 2/3 of the respondents feel it is true of the school, and scale scores are the numbers of positively scored items.

Only mean institutional data are used, in contrast with the CCI, in which both individual and institutional mean responses are interpreted. Pace (1968) reports different scale profiles for different types of schools: private liberal arts colleges, universities, engineering institutes, denominational schools, etc. Pace (1968) also presents some evidence for the generality of his educational climate dimensions by citing other empirical studies which produced factors of similar content. Stern's eleven first order factors, however, accurately reproduce all of Pace's dimensions except the Propriety scale, which is distributed over several CCI factors. In addition, the CCI factor scales permit a much finer breakdown of the perceived environment without greatly taxing the patience of respondents.

In short, CUES scores, despite their slightly different organization, seem to offer little advantage over institutional mean data on the CCI first order factor scores.

Astin and Holland (1961) created an objective method for describing a college environment, the Environmental Assessment Technique (EAT). Based on Holland's model of vocational preference, the EAT assumes that people entering vocational fields display personality profiles characteristic of those fields. Astin extends this theory to schools by assuming that students enrolling in a major field will tend to have personality characteristics similar to those of members of related professions. Thus colleges are characterized by the proportion of students majoring in fields belonging to each of Holland's six professional types. Table 7 defines the six types and lists the major fields classified in each.

TABLE 7
COLLEGE MAJOR FIELDS CORRESPONDING TO EACH OF SIX PERSONAL ORIENTATIONS

Orientation	Description	Relevant Major Fields
Realistic	"masculine, physically strong, unsociable, aggressive...prefers concrete to abstract"	agriculture, agricultural education, physical education, recreation, industrial arts, engineering, forestry, trade and industry
Intellectual	"task-oriented, intrceptive, asocial, prefers to think through rather than act out; needs to understand"	architecture, biological sciences, geography, medical technology, pharmacy, mathematics, philosophy, physical sciences, anthropology
Social	"sociable, responsible, feminine ...needs attention...avoids intellectual problem-solving...orally dependent"	health education, education of exceptional children and mentally retarded, speech correction, education (unclass.), nursing, occupational therapy, physical therapy, scholastic philosophy, social science (general), American civilization, sociology, social work
Conventional	"prefers structured numerical and verbal activities and subordinate roles...conforming..."	accounting, secretarial, business and commercial (general and unclass.),

TABLE 7 (Cont.)

Conventional (Cont.)	...identifies with power, externals, and status"	business education, library science, economics
Enterprising	"verbal skills for dominating, selling, leading others... orally aggressive"	hotel and restaurant administration, hospital administration, history, international relations, political science, foreign service, industrial relations, public administration
Artistic	"asocial; avoids problems which are highly structure or require gross physical skills...intra-ceptive...need for individualistic expression"	art education, music education, English and journalism, fine and applied arts (all fields), foreign language and literature (all fields).

Note.-From Astin and Holland, 1961.

If college climate can be viewed as a summary effect of the personality characteristics of all students, climate can be inferred from knowledge of the personality profile attributed to each vocational subgroup, and the proportion of students sharing this profile, plus data on the total size of the college, and the average intelligence level of students. The EAT thus consists of scores on size, intelligence, and the proportion of students majoring in fields corresponding to each of the six vocational areas. The major virtue of the method lies in the ease of collecting data. Nearly all colleges maintain information on total size, numbers of students in each major area, and some data from which overall intelligence can be inferred. (Astin employs mean NMSQT scores.) Thus climate profiles over the eight EAT variables can be developed for an institution without extensive testing of students. The weaknesses of the EAT lie in the subjective classification of fields of study to vocational types (e.g., is psychology a science, or an art?) and in its joint assumption that major field reflects occupation, occupation reflects interest, interest reflects personality, and personality determines climate. Astin and Holland report test-retest stability coefficients of greater than .80 for five of their six scales over a six year period for 31 institutions and show that the types of schools scoring very high in each of the six vocational categories actually do have orientations congruent with their categories (e.g., three technological institutes scored highest on the Realistic orientation).

Astin and Holland intercorrelated scores on their EAT with scores on Pace and Stern's CCI at 36 colleges and universities. Size of student body was negatively related to intellectuality (Achievement, Understanding, Fantasied Achievement, and counteraction) and positively related to compliance (Passivity and Deference) and a party atmosphere (Aggression, sex, exhibitionism,

and Pragmatism). This clearly parallels the Collegiate Culture AI-CCI joint factor. NMSQT intelligence scores were strongly related to Stern's AI-CCI on Intellectual Culture and correlated negatively with the vocational climate component of the non-intellectual climate factor. Both of these results support Stern's (1970) investigations of the CCI.

Scores for the Realistic orientation scale correlate positively with Pragmatism and negatively with Reflectiveness, Humanities, and Sensuality. This combination of pragmatism and conservatism resembles the Vocational Culture, although negative correlations with Achievement, Dominance, and Ego Achievement somewhat reduce the similarity.

Intellectual orientation correlated negatively with Deference and positively (though fairly low) with Fantasied Achievement, Understanding, and Objectivity. The lack of high correlations with Achievement, Humanities, and Counteraction indicates that this scale is not strongly related to the CCI intellectual climate and culture factors.

The EAT Social orientation describes a climate characterized by vanity, attention seeking, and interest in heterosexual interaction, with high correlations with Narcissism, Sex, and Exhibitionism. A negative relationship with Science indicates a dislike for the pure sciences.

The Conventional Orientation demonstrates very little relationship with any CCI scales. Its outstanding features are a notable lack of Achievement motive and a preference for Passivity over energetic activity.

Astin and Holland's Enterprising and Artistic Orientations rather surprisingly showed highly similar patterns of correlations across the 30 CCI scales. Both had high positive correlations with Humanism, Sensuality, Reflectiveness, and Harm Avoidance vs. Risk Taking, and negative correlations with Pragmatism. It is baffling why the Enterprising scale should correlate as it does with Pragmatism and Harm Avoidance. Astin and Holland suggest that perhaps if business related and especially promotional fields were classified as enterprising rather than conventional, an enterprising climate might reflect more pragmatism, aggression, and dominance.

It remains to be shown how the EAT relates to actual student behavior.

Astin (1962) investigated the dimensionality of what might be called the structural aspects of educational institutions. He factor analyzed data from 335 colleges and universities on 33 objective institutional variables in five areas--Institutional Type (e.g., private vs. public; liberal arts, technical or teacher training emphasis), Financial Characteristics (e.g., tuition, endowment, scholarship funds), Student Characteristics (e.g., % of males in student body, % of graduate students, and

all eight EAT measures), Faculty Characteristics (e.g., faculty/student ratio, % of faculty holding Ph.D.), and Miscellaneous Characteristics (e.g., library size, variety of curriculum, growth rate). A principal factors analysis yielded six factors which were labeled Affluence, Size, Private vs. Public Control, Masculinity, Homogeneity (range of scores on the six EAT dimensions and variety of curriculum), and Realistic (Technical) emphasis. Subgroups of the schools were factor analyzed separately: private schools, public schools, universities, liberal arts colleges, and men's institutions. Factor content in each of these subgroups was highly similar to the structure for the total sample, except that in all five subgroups analyses an additional factor of Intellectual Orientation or scholarship emerged.

It would be encouraging to discover at least some similarity between the factor structure of Astin's primarily objective "structural" variables and that of the perceptual measures described by Pace (1968) and Stern (1970). Clearly the relationship between perceptual indices like the CCI and its offspring, and more objective environmental measures demands investigation.

Astin (1968) tested the relationship of institutional structure variables to academic achievement. The criterion variables were scores on Graduate Record Examination tests of three content areas: Social Sciences, Humanities, and Natural Sciences. Subjects were 669 students from 38 universities and liberal arts colleges, for whom data were available on ten personal "input" variables including NMSQT scores, high school grades, highest degree planned, intended career, and intended field of study. Environmental measures of the institutions included: (a) selectivity (mean student ability, reflected by mean NMSQT score of incoming students), (b) per student expenditures on faculty and staff, (c) five measures from the Affluence scale obtained in the previous factor analytic study, and (d) mean perceived competition for grades as rated by students. Astin computed multiple correlations between each of the three criterion area scores and (1) combined student input and college environment variables; (2) student input and college environment variables separately; and (3) each of student input and college environment variables with the other statistically controlled. The results, shown in Table 8, indicate that environmental factors alone are not strongly related to achievement scores in the humanities and physical sciences, and that when individual ability is statistically controlled, the environmental measures employed here contribute almost nothing to achievement score variance. These results are due to the fact that student ability and performance can covary both within and across institutions, while institutional structure variables are constant within, and can vary only across schools. Apparently the only favorable effect environmental variables have on school performance is through attracting high quality students to the institution, and these effects disappear when student ability is statistically controlled.

TABLE 8
 PROPORTIONS OF ACHIEVEMENT TEST VARIANCE RELATED
 TO ENVIRONMENTAL AND INDIVIDUAL ABILITY FACTORS

Variance Source	Achievement Test Area		
	Social Sciences	Humanities	Natural Sciences
Joint individual & environment effects	.515	.486	.530
Individual ability	.482	.430	.496
College environment	.198	.106	.104
Ability independent of environment	.317	.380	.426
Environment independent of ability	.033	.056	.034

Note.-Taken from Astin, 1968.

Pervin's (1967) Transactional Analysis of Personality and Environment (TAPE) requires students to rate each of six concepts (self, student, administration, faculty, college, and ideal college) on 52 semantic differential scales. Pervin contends that behavior (organizational effectiveness?) is a function of the transaction between individuals and their environment, with each influencing the other. Analysis of profile patterns over concepts and over scales within and between schools provides information on how various environmental factors interact with individual characteristics to influence performance and satisfaction. Large differences in the ratings of different concepts within a school indicates that stresses are present among the component groups of the college. Such differences, especially between the self rating and other concepts, were found to be negatively correlated with satisfaction (Pervin, 1967). Different types of institutions, in terms of organizational and average member characteristics, can be defined by subgrouping schools on the basis of profile similarity on the six concepts for each, or for all, of the 52 scales. Data provided by Pervin indicate that individual scale test-retest stabilities are low (.4-.5) over a one month interval for a small number of students at a Midwest college. Ratings for self, student and college concepts had one month stability correlations of .6 to .7 for the same sample. Self-college and self-student discrepancy scores, the most relevant for intra-organizational analysis, showed one month test-retest

stabilities of .87 and .95 respectively. No data were provided on the reliability of inter-school profile differences.,

A 3-mode factor analysis of responses to the TAPE instrument produced the 13 scale factors listed in Figure 5, some of which appear compatible with dimensions described by Pace (1968) and Stern (1970) as consistently resulting from multivariate analyses of educational climate questionnaires.

FIGURE 5
TAPE EMPIRICAL FACTOR SCALES

1. Impulsivity vs. Inhibition
2. Humane idealism vs. Narcissism
3. Warm vs. Cold
4. Introversion vs. Extroversion
5. Goal directed activity vs. Undirected, unmotivated activity
6. Liberal idealism vs. Conservative pragmatism
7. Intellectualism, scholarship vs. Applied interests
8. Optimism vs. Pessimism
9. Conventionality
10. Feminine sensitivity vs. Masculine insensitivity
11. Artistic creativity vs. Pragmatism
12. High vs. Low regard for tradition
13. Cosmopolitanism vs. Rural provincialism

Notably, Pervin's Scholarship and idealism vs. practicality directly correspond to both CCI and CUES dimensions; Tradition and conventionality parallel Stern's Academic Organization and Pace's propriety factor; Warmth-coldness and introversion-extroversion seem similar to Pace's community; and Sensitivity may relate to Pace's Awareness factor. Finally, Pervin's Goal Directed Activity and Impulsivity appear comparable to Stern's Academic Achievement and Self Expression respectively. Thus, unlike Astin's objective measures, different methods of tapping student perceptions appear to produce highly similar environmental dimensions.

The Organizational Climate Description Questionnaire (Halpin & Croft, 1962) is a 64 item questionnaire tapping the climate of elementary schools by 4-point Likert scale responses to descriptive statements about peer (teacher) or principal behavior. Halpin and Croft focus on the interactions among teachers, and between principals and teachers as one important determinant of the "personality" or climate of a school. As shown in Table 9, the OCDQ has four scales tapping teachers' perceptions of typical peer group behavior, and four scales assessing perceptions of the behavior of principals in their interactions with teachers. Scales were derived by an iterative content-cluster analysis of 600 items describing the "interpersonal

TABLE 9
SCALES FROM THE ORGANIZATIONAL CLIMATE DESCRIPTION QUESTIONNAIRE

Dimensions	Number of items	Split half ^a reliability	Inter ^b rater correlations
1. Disengagement: group merely "going through the motions"; low involvement	10	.73	.59
2. Hindrance: performance hindered by petty administrative details	6	.68	.54
3. Esprit: morale; social & achievement need satisfaction	10	.75	.61
4. Intimacy: friendly social relations among members	7	.60	.49
5. Aloofness: high emotional distance from leader	9	.26	.76
6. Production emphasis: close, directive supervision	7	.55	.73
7. Thrust: group motivation by leader example & effort	9	.84	.75
8. Consideration: leader supportiveness	6	.59	.63

Note.-From Halpin & Croft (1962)

- a. Split half reliability with Spearman-Brown corrections, N = 1151 teachers.
- b. Correlations between means of odd and even groups of teachers within each school, computed over 71 schools.

events and experiences" of teachers. The analysis produced eight scales showing both reasonable internal consistency and a subjectively meaningful content.

A Q-factor analysis of a matrix of correlations between pairs of 71 schools, over the eight scales, generated three bipolar factors, labeled Authenticity vs. Hypocrisy in relationships, Social need satisfaction vs. Social control and Group vs. Leader Initiation of leadership acts. Schools having very high or very low loadings on only one of these factors were assumed to epitomize the "types" of school defined by the factors. Halpin and Croft thus derived three pairs of bipolar "types" of schools, each of the six types demonstrating a characteristic profile of scores over the eight initial climate scales. The six types were interpreted as ranging over a continuum of "Openness vs. Closedness", each with a characteristic pattern of internal social behaviors. Characterizations of the six types and their ideal loadings on the three Q-factors are illustrated in Table 10.

TABLE 10
IDEAL LOADINGS OF SIX SCHOOL TYPES ON THREE Q-FACTORS

School Types	Factors ^{a, b}		
	I	II	III
Open	1.0		
Autonomous			1.0
Controlled		-1.0	
Familiar		1.0	
Paternal			-1.0
Closed	-1.0		

a. Factors are Q-factors resulting from a factor analysis of a matrix of intercorrelations of pairs of schools (K=71) over 7 climate dimensions (N=8). Factors are defined as:

- I. Authenticity of leader interactions with group
- II. Social control vs. social need satisfaction
- III. Group vs. Leader initiation of leadership acts

b. Blank matrix entries are zeroes.

Summary of Educational Climate Measurement

Most climate models relate the interactive effects of perceived or objective global environment on individuals and their behavior. In general, research into the climate of educational organizations has not yet reached the stage where it can specify the nature of these interactive relationships. Most users of educational climate instruments to date have focused on determining the dimensions of climate through factor analysis of climate responses, or have attempted to gather normative data on a sufficiently large sample of institutions to permit assessment of the joint effects of climate differences and individual differences on performance and satisfaction. Exceptions to this generalization include Pervin's (1967) analysis of satisfaction as a function of individual-college fit, and the extensive work of Stern (1970) in both educational and noneducational areas.

Pace's (1968) discussion of consistently discovered dimensions of college environments are supported by Pervin's (1967) factor analysis of his semantic differential scales, and the consistency of several of these dimensions over a variety of scaling techniques lends strong support to their importance as central dimensions of educational institutions.

Astin's EAT, while attractive in its objectivity and ease of data collection, somehow seems too simple to be valid. Its many assumptions, and its somewhat blithe categorization of personalities on the basis of major field selection render it somewhat suspicious, and even Astin and Holland admit the foolhardiness of inferring overall college intelligence levels, as they do, from the high school test scores of as few as 15 or 20 students. Use of empirically derived scales, such as the CUES, the factor scales of the CCI and Pervin's TAPE technique, seems more justifiable, especially since a variety of studies have uncovered at least some apparently common dimensions. At the present, then, some assessment of student perceptions of Stern's 11 CCI factors, or Pervin's 13 TAPE factors will likely provide the most meaningful information on the nature of college environments, and the influences of those environments on the behavior of individual students.

Halpin and Croft's OCDQ, which assesses a limited portion of a slightly different educational setting, has proved at least somewhat amenable to adaptation for the study of other kinds of organizations (Friedlander & Margulies, 1969). Given the narrow focus of the OCDQ, a low correlation of its subscales with those of other educational assessment devices is not surprising. In general, it seems more appropriate to consider the OCDQ as a measure of organizational interpersonal behavior, originally applied in an educational setting, rather than as an instrument intrinsically focusing only on educational environments.

Climate Instruments: Organizational Climate

Instruments intended primarily to assess industrial or other non-educational organizations have tended to be both more focused, and less oriented to a specific type of organization than have the scales discussed so far. In assessing educational environments, researchers could more easily utilize a nomothetic model, assuming that the dimensionality of the environments of different schools was essentially the same, and that schools varied only in terms of profile patterns over these more or less universal dimensions. In order to maintain these assumptions, even the range of educational organizations sometimes had to be limited. For example, Halpin & Croft (1962) discovered that their OCDQ was not particularly relevant even to secondary school teachers.

Since the range of different types of non-educational organizations is considerably greater than that of colleges and universities, thus far it has not seemed profitable to attempt to assess organizations on a large number of environmental factors in order to define a universal set of environmental dimensions. For reasons of cost, limited availability of organizations for study, and to an extent, a lack of any generally accepted theory of the structure of organizational climate, non-educational researchers have tended to explore only those climate variables which seem relevant to specific performance problems in individual organizations. This has resulted in a somewhat non-overlapping, more idiographic picture of organizational climate.

Hemphill and Westie Questionnaire

One of the first instruments developed to assess the impact of groups' characteristics on their members was the Group Dimensions Descriptive Questionnaire (Hemphill & Westie, 1950). The questionnaire yields 14 scales tapping dimensions of group characteristics which were culled from previous literature on group behavior. Items are statements describing behaviors or attitudes which are rated on a 5-point Likert scale of the extent to which they are characteristics of the group. Items were generated from group members' responses to open ended questions about each of the 14 dimensions. The dimensions on which groups are assessed are listed in Figure 6. The constructs tapped by the GDDQ refer primarily to the social environment of the immediate group surrounding an organizational member. In the context of a larger organization, mean GDDQ responses of all primary work groups might be used to estimate the overall social environment as long as variation was fairly low over different hierarchical levels, or functional areas. Intergroup differences in scale profiles would indicate organizational subgroups having different internal climates, and might indicate potential sources of intergroup conflict or communications problems. The GDDQ could also be used to assess the degree to which expectations or desires of incoming members match group reality, or to determine the appropriateness of specific leader behaviors given the nature of the group, especially regarding group size, viscosity and control over members.

FIGURE 6
GDDQ DIMENSIONS

1. Autonomy: Degree to which the group is independent of other groups; self-determination of group activities.
2. Control: Degree of group regulation of member behavior.
3. Flexibility: Extent to which group activities are free from constraint by custom, tradition, written rules, or unwritten codes.
4. Hedonic Tone: Amount of pleasure afforded by membership.
5. Homogeneity: Degree of uniformity regarding the age, sex, race, social class, interests, attitudes, and habits of members.
6. Intimacy: Closeness of acquaintanceship; familiarity with personal details of each other's lives.
7. Participation: Proportion of time spent in group activities.
8. Permeability: Openness of group to new members.
9. Polarization: Degree to which group goal is unitary, and explicit to all members.
10. Potency: Centrality of group membership in the lives of the members.
11. Size: Number of members.
12. Stability: Resistance to structural changes over time; rate of turnover.
13. Stratification: Differentiation of internal status hierarchy.
14. Viscosity: Cohesiveness; absence of dissension and conflict; degree to which all members function as a unit.

Survey of Organizations (ISR)

Similar to the GDDQ in its focus on the group as the primary source of influence in an organization is the work by Likert (1967) and the Survey of Organizations (Taylor & Bowers, 1972) of the University of Michigan's Institute for Social Research. The Survey of Organizations is a standardized questionnaire intended to discover organizational barriers to improving overall performance. As was noted in a previous section, a portion of the questionnaire is devoted to items intended to assess organizational climate. Likert (1967) theorizes

that performance and satisfaction are the results of leadership behaviors and of organizational climate, with the effects of these variables mediated by peer leadership influences and group processes. A partial test of some of the causal statements (Franklin, 1973) was reported in a previous section. Climate is conceived as the perceived total impact upon a work group of the constraints, policies, and evolving demands of other superior work groups in the organizational hierarchy. It was originally hypothesized that these imposed constraints would affect the nature of motivational forces, and communications, coordination, decision making, goal setting, and control and influence processes within and between work groups. Items tapping these areas comprise the climate scale of the survey. A cluster analysis of data from 1448 work groups revealed six interrelated clusters of items in the climate scale, four clusters which appeared in an earlier analysis on a smaller sample, and two clusters which have yet to be replicated, and hence are considered tentative experimental scales. Empirical cluster scales are presented in Table 11. Responses are summed over scales to derive a total climate score for each work group.

TABLE 11
SURVEY OF ORGANIZATIONS EMPIRICAL CLIMATE SCALES

Scale	Items	Internal Consistency
1. Human Resources Primacy: Concern for welfare & happiness of workers	3	.80
2. Communications Flow: Freedom of flow of task relevant information within & between groups	3	.78
3. Motivational Conditions: Presence & nature of organizational factors eliciting effort	3	.80
4. Decision Making Practices: Decision making characterized by delegation & participation vs. centralization	4	.79
5. Technological Readiness ^a : Quality & innovativeness of work methods & equipment	2	.58
6. Lower Level Influence ^a : Amount of influence possessed by workers and first level supervisors	2	.70

a. Tentative, experimental scale

Cross lag correlations were computed between overall climate scale and various dependent variables over time intervals varying from six months to two years. Climate correlates high positive with satisfaction, as measured by the Survey of Organizations questionnaire: two survey administrations yielded concurrent correlations of .78 and .88, and the cross lag correlation between climate and satisfaction over a six month interval was .78. All values are significant at $p < .01$. The difference between the climate-satisfaction and the satisfaction-climate correlations over the six month interval is also highly significant providing some support for a model of favorable climate as a precondition to satisfaction.

The relationship between climate and performance criteria is more equivocal. Taylor and Bowers administered their survey once, and gathered performance data on a number of variables over a period of 6 to 18 months. They then computed correlations between their survey variables and the organizational performance variables at various time intervals. Results are reported for each firm, and for each six month performance data collection interval, in terms of the percentage of correlations that are significant, and mean value of significant correlations. The former is generally the more informative index, although a mean significant correlation near zero indicates at least two significant correlations with opposite signs during a single data interval. Such results are difficult to handle in any model.

In general, more than 20% of correlations are significant between concurrent measures of climate and cost data, absence rate, time lost due to sickness and minor injuries, and grievances. Predictive relationships between climate measures and performance data collected 12 or 18 months later are either low or inconsistent across different organizations. No clear causal link exists between climate and subsequent performance. No significant concurrent correlations were obtained between climate and product quality, turnover, or disabling injuries.

These performance results, taken together with the high correlation between climate and survey satisfaction measures, seem to indicate that the ISR climate scale serves as a concurrent index of satisfaction and its behavioral indicators (cost data, absenteeism), but not of actual performance variables (e.g., product quality). Climate has so far predicted little except subsequently rated satisfaction.

* In sum, the apparent lack of heterogeneity of climate subscales (scale intercorrelations range from .41 to .78, with a median value of .64), the high correlation with rated satisfaction, and the low relationship with nonsatisfaction criterion measures implies that the ISR climate scale might possibly be interpreted as a homogeneous measure of worker satisfaction.

Schneider and Bartlett

Schneider and Bartlett (1968) developed an insurance Agency Climate Questionnaire (ACQ) to permit quantitative assessment of the social environment of insurance agencies. The instrument was derived from a factor analysis of 299 social climate items generating six factor scales tapped by 80 Likert type items. The scales are listed in Table 12.

TABLE 12
AGENCY CLIMATE QUESTIONNAIRE EMPIRICAL SCALES

Scale	Items	Reliability ^a
1. Managerial Supportiveness	15	.90
2. Managerial Structure (Emphasis on performance)	15	.65
3. Concern for New Employees	13	.59
4. Intra Agency Conflict	11	.76
5. Agent Independence	11	.52
6. General Satisfaction	15	.74

a. Scale average item intercorrelations, with Spearman-Brown corrections, for 386 agents.

Schneider's major contribution to the study of climate is his discovery (Schneider & Bartlett, 1970) that different hierarchical levels within agencies perceive agency climate differently. Schneider and Bartlett (1970) found very low correlations between responses of managers and agents to the same climate scales. They did conclude, however, that there is reasonably consensus within hierarchical levels, although here, too, the highest average interrater correlation for any scale was .26, and only two scales, General Satisfaction and Structure, convincingly demonstrated discriminant validity within levels.

Schneider hopes to show that the performance of new agents is related to any of three agent-environment "fit" models: The match between new agent climate

preferences and expectations, the match between new agent preferences and actual agency climate as perceived by current agents, and the match between new agent expectations and actual climate. Thus far Schneider (1972) has found that new agent preferences are unrealistically high, that even new agent expectations are slightly higher than manager perceptions, and that old agent perceptions of actual climate are considerably lower than their managers' ratings. The mean correlation over six scales between new agents' expectations and old agents' perceptions is marginally significant, though very small ($r = .17$, $p < .10$), leading Schneider optimistically to hypothesize some mechanism producing a match between expectations and the reality of the organization entered. Computing the correlation between climate expectations and actual climate of agencies not entered, would determine whether this "mechanism" is merely a generalized stereotype of insurance agencies, rather than some process by which new agents somehow sort themselves into compatible work environments. In any case, a mean correlation of .17 is not very strong evidence for an important relationship between new and old agents' opinions. Perhaps a more meaningful model of new agent behavior postulates two stages for the employment process. Agents initially go to agencies in which the pattern and elevation of the climate perceptions of the recruiting member (usually the manager) are most similar to those of the prospective agent. After the contract is signed, tenure and performance might be more closely related to the discrepancy between expected and actual climate as measured by elevation and pattern differences between new agent expectations and old agent perceptions. The first part of such a model would definitely be compatible with the data Schneider presents.

Schneider and Dachler (1972) present a wide conception of climate as a joint function of employee perceptions, and the perceptions of the organization by non-members who are important to the employee. Thus, the attitudes of family and friends affect the global perceptions of the organization by its members. In this conceptualization, climate is viewed as an index of the instrumentality of the organization for members' personal goals. If the organization is perceived by the member or his relevant others as leading to favorable personal outcomes, the global organization perception (i.e., climate), is favorable, and the member will feel motivated to remain and participate actively in the organization. The validity of this motivational climate model has yet to be tested.

Evan

Evan (1968) also presents a model of climate perceived by non-members of the organization. In his view, non-members' perceptions of the "essential attributes of character" of an organization will affect their willingness to deal with the organization as suppliers or consumers, and thus directly impinge upon the organization. Evan's too is a theoretical paper, and no studies have yet been published dealing with the climate perceptions of non-members.

Modification of Educational Climate Measures

As was mentioned earlier, Halpin and Croft's Organizational Climate Description Questionnaire, although developed for use in elementary schools, assesses factors relevant to any organization (see Table 3). Friedlander and Margulies (1969), using a slightly reworded version of the OCDQ, attempted to assess the relationship between the 8 OCDQ dimensions and worker satisfaction with three work factors: interpersonal relationships, involvement in the task, and opportunity for advancement. The sample consisted of 95 employees (91 parts makers and assemblers and 4 supervisors) from 4 departments of an electronics firm. The authors found that two OCDQ scales, Aloofness and Production Emphasis, did not correlate with any of the three satisfaction measures, while the other six scales all correlated significantly with all the satisfaction areas. A stepwise multiple regression of each satisfaction measure on to the 8 OCDQ dimensions indicated that two dimensions, Thrust and Hindrance, were central to satisfaction with all three job factors. In addition, Esprit was an important component of social need satisfaction, and Intimacy was related to satisfaction with advancement opportunity. However, the sample size is not large, and without cross validation it may be dangerous to interpret the differential contributions of the various climate factors to satisfaction. Friedlander and Margulies also divided their subjects into groups rating high and low importance for each of their three satisfaction measures, and computed a separate multiple correlation for each of the two groups on each variable. They report large regression weights for Thrust, Intimacy, and low Hindrance in the high importance group, and low Esprit and low Disengagement for the low importance group on all three satisfaction measures. Unfortunately, they neglect to reproduce the regression weights themselves, and surprisingly, they fail to report the value of the multiple correlations, controlling for importance of the satisfaction areas. One can only assume that these correlations were no higher than the uncontrolled multiple correlation between climate and satisfaction, but the actual values of these correlations would be extremely valuable to assess a worker-environment-fit climate model.

Friedlander and Greenberg (1971) investigated the relationships between peer and supervisory supportiveness and job performance for a group of 22 "hard core unemployed". These workers'-rated perceptions on three "supportiveness" scales were significantly lower than their supervisors' ratings ($p < .01$). Workers' ratings on all three scales correlated significantly ($p < .05$) with supervisors' ratings of worker competence, congeniality, and conscientiousness; worker ratings of supervisory support correlated with supervisor ratings on effort and intelligence. Unfortunately, Friedlander and Greenberg fail to report the correlation, if any, with their only objective criterion, job tenure. This is especially disappointing because they did interrelate tenure with their other dependent variables, and found negative correlations between length of tenure and all of their supervisory ratings of performance. Supervisor ratings of reliability (regular attendance) correlates $-.60$ ($p < .01$) with tenure. Friedlander and Greenberg are unable to explain these consistent negative correlations with tenure, which casts some doubt on the validity of the supervisory ratings and the study in general.

The Organizational Climate Index (OCI) was developed by Stern (1970) as a generalized instrument to assess the need-press characteristics of any organization. The OCI, like the College Characteristics Index, consists of 30 10-item scales measuring environmental press on 30 of Murray's needs (see Figure 2). Data were collected on the OCI for three dissimilar samples: 931 teachers in 44 elementary, junior high, and high schools in Syracuse, New York; 2505 Peace Corps trainees in 63 separate units in the U.S.; and 223 industrial workers (white and blue collar levels) in three remote locations (Alaska, the Near East, and an isolated location in the continental U.S.). Within the school and Peace Corps samples, each of the 30 scales significantly ($p < .01$) discriminated among the 44 schools and the 63 units respectively. For the industrial sample, 2/3 of the scales differentiated among the three work sites ($p < .05$). The scales also differentiated among the three different types of organization. Schools were rated high in their press for adaptability, sociability, energy, social action, and reflectiveness. The industrial sample emphasized sociability and pragmatism. Separate factor analyses of the three sets of data each yielded six factors. All three samples showed factors of Intellectual Climate, Orderliness, Impulse Control, and Supportiveness (see Table 13).

TABLE 13
OCI FIRST ORDER FACTORS SHARED BY
THREE DISSIMILAR ORGANIZATIONAL SAMPLES

Factors	High Loading OCI Scales
Intellectual Climate	Humanities Reflectiveness Science Ego Achievement Fantasied Achievement Sensuality Understanding
Orderliness	Order Adaptability Conjunctivity Harm Avoidance Narcissism
Impulse Control	Blame Avoidance vs. Aggression Counteraction (negative) Deference Placidity vs. Emotionality Deliberation vs. Impulsiveness Work vs. Play Prudishness vs. Sexuality

TABLE 13 (Cont.)

Factors	High Loading OCI Scales
Supportiveness	Assurance vs. Abasement Tolerance vs. Dominance Objectivity vs. Projectivity Affiliation Conjunctivity Harm Avoidance Supplication

All three samples demonstrated identical second order features of Development Press and Control Press. Development Press represents an environmental emphasis on intelligent and organized pursuit of organizational goals in a supportive atmosphere. Control Press is an emphasis on self control over behaviors perceived as improper or harmful to the organization. It is unclear whether Stern's respondents were describing pressures from the official organization, their peers, or both, and which press was emphasized when official and peer pressures were divergent. Such differences may explain why, in the school sample, the Intellectual factor and an Achievement factor loaded on the Development second order factor, and their inverses (Non-achievement and Non-intellectual Climate) on the control factor. These might represent simultaneous administration press for intellectual climate and high achievement standards, and peer pressure against looking good at the expense of fellow teachers. A study investigating the differences in press from different sources might be informative under the need-press model.

Payne and Pheysey

Payne and Pheysey (1971), reasoning that there is no obvious reason for organizational climate to be structured in the same way as individual personality, sought to reorganize the 300 OCI items to help investigate the relationships among organizational structure, climate, and performance (Pugh et al., 1963). Payne and Pheysey subjectively classified 254 of the 300 OCI items into 24 content categories. A sample of 120 managers from 100 firms responded to these scales, and an item analysis retained 192 items in 24 scales, titled the Business Organization Climate Index (BOCI). The scales and their reliabilities are listed in Table 14.

TABLE 14
BOCI SCALES

Scale Title	Number of items	Split-half reliability
Authority scales		
Leader's Psychological Distance	8	0.64
Questioning Authority	7	0.76
Egalitarianism	6	0.82
Management Concern for Employee Involvement	10	0.88
Restraint scales		
Open Mindedness	8	0.82
Emotional Control	7	0.64
Physical Caution	4	0.58
Work interest scales		
Practical Orientation	6	0.72
Future Orientation	6	0.86
Scientific and Technical Orientation	8	0.88
Intellectual Orientation	11	0.46
Job Challenge	11	0.66
Task Orientation	8	0.84
Industriousness	14	0.86

TABLE 14 (Cont.)

Personal relations scales		
Altruism	7	0.62
Sociability	10	0.92
Interpersonal Aggression	6	0.78
Homogeneity	4	0.26
Routine Scales		
Rules Orientation	6	0.72
Administrative Efficiency	9	0.78
Conventionality	10	0.82
Readiness to Innovate	9	0.80
Variety in Physical Environment	5	0.60
Community scales		
Orientation to Wider Community	12	0.72
TOTAL	192	

High and low level managers in each of two British firms responded to the BOCI and, contrary to Schneider and Bartlett's (1970) findings in U.S. insurance agencies, no hierarchical differences in climate perceptions appeared. Although Payne and Pheysey's samples are all managerial personnel, while Schneider compared managers with sales employees, it is unclear that this accounts for the different results. Further research into the causes and implications of intraorganizational differences in climate perceptions is of great importance. Payne and Pheysey also found no differences in the climate perceptions of line and staff managers within firms, justifying the use of mean data as an estimate of overall organizational climate.

A factor analysis of responses by the two managerial samples to the 24 climate scales yielded five factors. Payne and Pheysey describe the first

general factor as Organizational Progressiveness, loaded most heavily by Intellectual Orientation, Future Orientation, Management Concern for Employee Involvement, Task Orientation, and Scientific-Technical Orientation. The second factor is Normative Control, loaded by Rules Orientation, Leader's psychological distance, Conventionality, Emotional control, and Closed-mindedness. The similarity of these two factors to Stern's (1970) second order factors of Development and Control Press is obvious. Payne and Pheysey do not interpret their third factor, but it is heavily loaded by Readiness to innovate (.50), Homogeneity (-.73), Interpersonal aggression (.35), Egalitarianism (-.33), and Job challenge (.32). These loadings can be interpreted as defining an Individualistic creativity vs. Conforming homogeneity factor, and would again represent a peer-press dimension, in contrast to the primarily official organizational press underlying the first two factors.

Payne and Pheysey compared the climates of three organizations selected for their differences in structural and context variables. Firms A and B were of similar size and technology type, but the work activities of Firm A were much more highly structured than those of Firm B. Firm C, like Firm A, was highly structured, but had nearly 10 times as many employees as Firm A, and operated in a mass rather than batch production mode. N's were 50 managerial personnel from A, 22 from B, and 21 from C.

Firm A was predictably more pragmatic and more structured than Firm B, scoring significantly higher on all 7 Work Interest Scales (see Table 14), and on 4 of 5 Routine scales. Firm A was lower in Altruism and on Orientation to the Community. Paradoxically, Firm A scored significantly lower than Firm B in Leader's Psychological Distance, and higher in amount of Questioning of Authority. In terms of the factors derived from the scale responses, Firm A is significantly higher in Organizational Progressiveness (a pragmatic-performance dimension), but not in Control or in Independence vs. Conformity. The overall picture of Firm A shows a highly structured, centralized, efficient, and task centered firm, in which superiors and subordinates enjoy reasonably close contact including some open conflict if managers disagree with their superiors' directives.

The climate perceptions of managers in Firm C, the large, structured organization, are surprisingly similar to those of Firm B. Firm A is again significantly higher on the Work Interest Scales and the Routine Scales, and lower in Leader's Psychological Distance. From these results it seems safe to conclude that managerial climate, at least as measured by the BOCI, is not necessarily related to size and structuring factors, but perhaps involves more nebulous social variables such as a tradition of managerial paternalism, rather than a more mechanistic management.

Litwin and Stringer - 7

Litwin and Stringer (1968) describe the development of a climate scale based on Atkinson's need-motivation theory. According to Atkinson's model, the motivation to perform a given behavior is a joint function of the strength

of a need or motive in the individual, the expectancy that the behavior will lead to need satisfaction, and the incentive value of the behavioral outcome, or the amount the need will be satisfied if the behavior is performed ($\text{Behavior} = \text{Motive Strength} \times \text{Expectancy} \times \text{Incentive}$). Need or motive level is a relatively fixed characteristic of the individual, but the expectancy level and, to an extent, the incentive value are determined by situational factors. There are three major needs or motives: achievement, affiliation, and power. For Litwin and Stringer, then, organizational climate is a global index of the degree to which the organizational environment generates expectancies and incentives favorable to all three motives for most organization members. There are nine basic dimensions of climate, each relevant to one or two motives (see Table 15).

TABLE 15
THEORETICAL SCALES FROM THE
LITWIN AND STRINGER CLIMATE QUESTIONNAIRE

Scale	Definition	Number of items	Mean item intercorrelation
Structure	Emphasis on constraints, rules, regulations & formal procedures	8	.31
Responsibility	Employee discretion in work, without supervisor checking up	7	.23
Reward	Level & perceived fairness of positive job outcomes	6	.42
Risk	Degree of risk and challenge in job	5	.29
Warmth	Friendliness within the work group and the organization	5	.33
Support	Perceived helpfulness & backing received from superiors, peers, and subordinates	5	.37
Standards	Perceived importance of organizational goals & performance standards	6	.21
Conflict	Emphasis on working through rather than avoiding conflicts	4	.19
Identity	Feeling of belonging to the organization & the work group	4	.49

These dimensions are tapped by 50 items, rated on a 4-point Likert scale from "Definitely Agree" to "Definitely Disagree". To the extent that the pattern of organizational climate scores matches the need structure of organization members, employees will experience a relatively high product of motive strength, expectancy, and incentive, and will therefore be highly motivated to perform. The Litwin and Stringer model thus relates performance to the degree of fit between personal need structure and organizational climate. To the extent that all organizational members possess all needs, an emphasis on achievement rather than power or affiliation should result in greater productivity.

In a study of the effects of leadership style on perceived climate, Litwin and Stringer manipulated leadership behaviors in three simulated organizations of 15 members, matched for age, experience, and initial need levels on the three Atkinson motives. The three leaders were to establish organizational norms to arouse, respectively, motives for power, affiliation, and achievement. The power oriented leader emphasized formal procedures, rule-following, order, and following formal communications channels. The affiliation oriented leader emphasized informality, warmth, noncontingent reward, no punishment, high cooperation, and conflict avoidance. The achievement group leader emphasized informal procedures, but high performance standards, individual performance-contingent rewards, risk-taking, involvement, and acceptance of task-related conflict. The results showed the power oriented organization rated higher than the others on the Structure and Conflict climate scales; the affiliation oriented group higher on the Reward and Warmth scales; and the achievement oriented group higher in Responsibility and Risk. All six of these scales produced significant ($p < .05$) differences among the three firms. Members of the power oriented firm were less satisfied and less innovative in their performance than the members of the other two groups, and the achievement oriented group members displayed greater productivity.

Litwin and Stringer also present two organizational case studies in which climate scores are related to performance and satisfaction indices. First, in the service office of a public utility company a combination of high worker need for achievement, and low company climate in the Responsibility, Risk, Identity, and Warmth dimensions was related to high turnover and expressed dissatisfaction. In the second study, differences on the Responsibility, Risk, Reward, Warmth, and Identity climate scales between two otherwise similar production plants were related to performance standing relative to competing firms. The performance data for these "studies" are qualitative and subjective and the results should be accepted cautiously. The simulation study, while providing supporting quantitative results, has limited generalizability without some impressive inferential leaps.

The Litwin and Stringer scales, like those of the Survey of Organizations, are highly intercorrelated (scale intercorrelations range from .18 to .69 for the nine scales) and scales are not terribly homogeneous (the highest

scale mean item intercorrelation is .49 for four Identity items). The Structure, Risk, Standards, and Conflict scales appear to be relatively independent, while some commonality seems to run through the Responsibility, Reward, Warmth, Support, and Identity dimensions.

In spite of these imperfect scaling properties, the Litwin and Stringer climate scales represent an attempt to measure a priori dimensions of the environment and to relate them to an existing theory of behavior in organizations. Such attempts are worthwhile and will provide more immediately useful information relevant to the theory in question than will an ad hoc, shotgun empiricist approach to climate exploration. The favorable results of the simulation and case studies at least warrant a further, more rigorous testing of the instrument, possibly leading to new scale refinements.

House and Rizzo

House and Rizzo (1972a, 1972b) generated and tested a hypothetical model of the relationship among various environmental features of a manufacturing organization, its effectiveness, and the satisfaction and perceived stress felt by its members. All data were derived from questionnaire responses by 200 salaried employees of the organization. House and Rizzo's original set of measures consisted of a 19-scale Organizational Climate Questionnaire (see Table 16), plus scales measuring Role Conflict and Role Ambiguity (Rizzo, House, & Lirtzman, 1970), ratings of job induced anxiety, reports of the

TABLE 16
OCQ THEORETICAL SCALES

Scales	Number of items	Reliability ^a
1. Conflict and inconsistency	6	.86
2. Decision timeliness	5	.73
3. Emphasis on analytical decision methods	3	.61
4. Emphasis on employee skill development	4	.75
5. Formalization	8	.83
6. Goal consensus and clarity	2	.74
7. Communications adequacy	7	.78

TABLE 16 (Cont.)

8. Information distortion and suppression	3	.61
9. Job pressure	2	.28
10. Adequacy of planning	5	.81
11. Smoothness of horizontal communication	6	.79
12. Selection on ability and performance	8	.80
13. Tolerance of error	4	.71
14. Top management receptiveness to ideas	2	.58
15. Upward information demands	3	.74
16. Adherence to chain of command	3	.48
17. Work flow coordination	3	.64
18. Adaptability to change	4	.48
19. Adequacy of authority	4	.73

Note.-Taken from House and Rizzo, 1972a.

a. Kuder-Richardson reliabilities.

likelihood of leaving the organization, and satisfaction with job, pay, promotion, autonomy, security, recognition, and social aspects. The climate measure consisted of 82 descriptive statements rated for their applicability to the organization on a 7-point Likert scale. Responses to all these measures were factor analyzed (House & Rizzo, 1972b), producing seven factors of organizational practices, and their effects. While all these factors reflect perceptions of the work environment, the Anxiety, Propensity to Leave, and perhaps the Satisfaction dimensions are more clearly the perceived results of other environmental characteristics, and hence are treated as dependent variables. Formalization and Supportiveness are viewed as independent variables, and Role Perceptions are interpreted as mediating the effects of Formalization and Support on the dependent variables. The role of "Perceived Effectiveness" is less clear. House and Rizzo treat it as a fourth dependent variable class, but it could well be treated as a causal variable. Its content involves subjects such as secretive handling of information, quality

TABLE 17
FACTOR SCALES OF ORGANIZATIONAL PRACTICES AND OUTCOMES

Factors	High Loading Scales	Number of items	Reliability ^a
Role Perceptions	Role Conflict	8	.82
	Role Ambiguity	6	.78
Formalization Practices	Initiating Structure ^b	6	.65
	Formalization ^c	8	.82
	Planning Adequacy ^c	5	.79
	Horizontal Communications ^c	6	.82
	Selection on Ability ^c	8	.87
	Adherence to Chain of Command ^c	3	.65
Supportive Leadership Practices	Supervisory Supportiveness ^b	9	.85
	Emphasis on Employee Development ^c	4	.82
	Tolerance of Error ^c	4	.70
Perceived Organizational Effectiveness	Decision Timeliness ^c	5	.79
	Information Distribution & Suppression	3	.58
	Work Flow Coordination ^c	3	.75
	Adaptability to Change ^c	4	.59
Satisfaction	Advancement Opportunity	3	.83
	Autonomy	3	.82
	Intrinsic Job Satisfaction	3	.92

TABLE 17 (Cont.)

Satisfaction (Cont.)	Security	2	.70
	Pay	5	.86
	Recognition	4	.85
	Social Environment	5	.78
	Adequacy of Authority ^c	4	.73
Anxiety-Stress	Job Induced	7	.83
	Somatic Tension	5	.76
	General Fatigue	5	.72
Propensity to Leave	Likelihood of Leaving	2	--

Note.-Taken from House and Rizzo, 1972b.

a. Kuder-Richardson reliabilities.

b. Developed from Leadership Behavior Description Questionnaire items (Stogdill, 1965).

c. From Organization Climate Questionnaire.

and quantity of feedback, openness to change, and willingness to make potentially risky decisions. This is very similar to an empirical climate scale described by Campbell and Beaty (1971) as Openness vs. Defensiveness, which relates to the "degree to which people try to cover their mistakes and look good rather than communicate freely and cooperate". As such, "Perceived Effectiveness" could also be expected to have an effect on the remaining three dependent variables, mediated by role conflict and ambiguity. No correlations, however, are reported between effectiveness and the other dependent variables, and this interpretation can only be considered as an hypothesis.

House and Rizzo found no important relationships between either independent dimension and anxiety, and only low correlations with propensity to leave. For both sets of independent variables, fairly high relationships (median correlations in the upper .30's or lower .40's) were obtained with perceived

effectiveness, and moderate correlations (medians in the upper .20's) were found for satisfaction ratings. These median values are significant at the .01 level or better. The independent variables and the Role Perceptions dimension correlate about equally with perceived effectiveness, but Role Ambiguity correlated much higher with the satisfaction measures than did the other variables.

In sum, House and Rizzo found first that measures of organizational formalization and supportiveness correlate fairly highly with similar measures of perceived effectiveness, and that some of this correlation was due to the clarity of role perceptions. Second, they found that role clarity correlates much more highly with employee satisfaction than do organizational or supervisory practices. Finally, they found that none of the variables measured relate very highly to the slightly more behaviorally anchored criteria of perceived physical stress and likelihood of leaving the organization.

Campbell

In a review of the literature related to organizational climate, Campbell, Dunnette, Lawler, and Weick (1970) cite four dimensions of climate that appear consistently across studies: Structure imposed on the work, individual autonomy and accountability, reward levels, and consideration, warmth, or supportiveness. In an attempt to broaden the range of environmental factors to be assessed, Campbell and his associates used an a priori "model" of climate containing 21 dimensions to generate 110 Likert type items, 5 items per dimension (Campbell & Beaty, 1971). Using these items, 300 employees in an industrial plant described both their immediate work group and the total organization and the responses were cluster analyzed, producing 10 dimensions of perceived organizational environment, and 13 work group dimensions. Raw cluster scale scores and supervisor-subordinate discrepancy scores for each work group were correlated with ratings of work group and supervisor

FIGURE 7

DEFINITIONS OF CLUSTERS DERIVED BY THE WARD AND HOOK HIERARCHICAL CLUSTER ANALYSIS PROCEDURE FOR THE DESCRIPTION OF THE TOTAL ORGANIZATION CLIMATE

1. Task Structure. The degree to which the methods used to accomplish tasks are spelled out by the organization.
2. Reward/Performance Relationship. Reflects the degree to which the granting of additional rewards such as promotions and salary increases are based on performance and merit rather than other considerations such as seniority, favoritism, etc.
3. Decision Centralization. The extent to which decision making is reserved for top management.

FIGURE 7 (Cont.)

4. Achievement Emphasis. The desire on the part of the people in the organization to do a good job and contribute to the performance of the organization.
5. Training and Development Emphasis. Degree to which the organization tries to support the performance of individuals through appropriate training and development experiences.
6. Security vs. Risk. Reflects the degree to which pressures in the organization lead to feelings of insecurity and anxiety.
7. Openness vs. Defensiveness. Degree to which people try to cover their mistakes and look good rather than communicate freely and cooperate.
8. Status and Morale. The general feeling among individuals that the organization is a good place in which to work.
9. Recognition and Feedback. Degree to which an individual knows what his supervisor and management think of his work and the degree to which they support him.
10. General Organizational Competence and Flexibility. The degree to which an organization knows what its goals are and pursues them in a flexible and innovative manner. Includes the extent to which it anticipates problems, develops new methods, and develops new skills in people before problems become crises.

Note.-From Campbell & Beaty (1971).

FIGURE 8

DEFINITIONS OF CLUSTERS DERIVED BY THE WARD AND HOOK HIERARCHICAL CLUSTER ANALYSIS PROCEDURE FOR THE DESCRIPTION OF WORK GROUP CLIMATE

1. Task Structure. The degree to which the methods used to accomplish tasks are spelled out by the organization.
2. Reward/Performance Relationship. Reflects the degree to which the granting of additional rewards such as promotions and salary increases are based on performance and merit rather than other considerations such as seniority, favoritism, etc.
3. Decision Centralization. The extent to which decision making is reserved for top management.

FIGURE 8 (Cont.)

4. Achievement Emphasis. The desire on the part of the people in the organization to do a good job and contribute to the performance of the organization.
5. Training and Development Emphasis. Degree to which the organization tries to support the performance of individuals through appropriate training and development experiences.
6. Security vs. Risk. Reflects the degree to which pressures in the organization lead to feelings of insecurity and anxiety.
7. Openness vs. Defensiveness. Degree to which people try to cover their mistakes and look good rather than communicate freely and cooperate.
8. Work Group Reputation. Reflects the status and reputation of the individual's work group as compared to other work groups.
9. Satisfaction and Morale. Reflects the general level of morale in the group.
10. Supportiveness. Degree to which the supervisory and other group members generate a supportive and friendly atmosphere.
11. Initial Job Orientation. Degree to which individuals are informed as to what to expect when they first start on the job.
12. Problem Solving Ability. Extent to which the work group can anticipate and solve problems related to group functioning.
13. Concern for Excellence. Degree to which the group is concerned with improving individual performance and being flexible, innovative, and competent.

Note.-From Campbell & Beaty (1971).

performance. The results indicate that raw and discrepancy scores on Achievement Emphasis, Security vs. Risk, Training Emphasis, Supportiveness, and Status or Reputation are significantly related (r 's ranging from .35-.50) to performance ratings. The relationships are somewhat stronger for work group than for plant climate descriptions, especially in the case of discrepancy scores.

Hackman and Lawler

Hackman and Lawler (1971) investigated the relationships among four job characteristics, employee satisfaction, and employee desires for achievement, autonomy, growth, responsibility, variety and involvement in their work. The job characteristics were Variety, Autonomy, Task Identity, or ability to identify with the finished product, and Feedback. These were measured by Turner and Lawrence's (1965) Requisite Task Attribute Index. Hackman and Lawler found that self-ratings of motivation, satisfaction and involvement were significantly correlated with all four job dimensions, although correlations with Task Identity were fairly low ($< .20$). Supervisors' ratings of worker effectiveness correlated $.20$ and $.26$ respectively with perceived Variety and Autonomy of the work. Absenteeism correlated $-.22$ with Task Identity. Hackman and Lawler tested a person-environment fit hypothesis by computing correlations between the 4 job dimensions and the 4 dependent variables separately for employees with very high and with very low desires for higher-order need satisfaction. They found that employees in the top third of the need-strength distribution had higher correlations between job attitude (motivation, satisfaction, and involvement) and two job dimensions (Variety and Autonomy) but this was not true for actual performance or absenteeism. Task Identity and Feedback correlations with dependent variables were not moderated by need strength.

Summary and Conclusions

In light of all this research, what can be said about organizational climate? First, multivariate analyses of various climate instruments have consistently indicated the importance of a number of dimensions of perceived environments. These are listed in Figure 9, along with the studies and empirical dimensions supporting them.

FIGURE 9
CONSISTENTLY APPEARING CLIMATE DIMENSIONS

I. Autonomy:

- 1) Litwin & Stringer (1968) Responsibility
- 2) Halpin & Croft (1962) (inverse of) Hindrance
- 3) Schneider & Bartlett (1968) Agent Autonomy
- 4) Hackman & Lawler (1971) Autonomy

II. Structure:

- 1) Stern (1970) OCI Orderliness
- 2) Payne & Pheysey (1971) BOCI Routine scales
- 3) Litwin & Stringer (1968) Structure
- 4) Halpin & Croft (1962) Production Emphasis
- 5) Schneider & Bartlett (1968) Managerial Structure
- 6) House & Rizzo (1972b) Formalization
- 7) Campbell & Beaty (1971) Structure

FIGURE 9 (Cont.)

III. Reward Orientation:

- 1) Litwin & Stringer (1968) Reward
- 2) Schneider & Bartlett (1968) General Satisfaction
- 3) Campbell & Beaty (1971) Reward Performance Relationship
- 4) Taylor & Bowers (1972) Motivational Conditions

IV. Consideration and Support:

- 1) Stern (1970) OCI Supportiveness-Personal Dignity
- 2) Payne & Pheysey (1971) BOCI Authority & Personal Relations scales
- 3) Taylor & Bowers (1972) Human Resources Primacy
- 4) Litwin & Stringer (1968) Support and Warmth
- 5) Halpin & Croft (1962) Consideration and Intimacy
- 6) Schneider & Bartlett (1968) Managerial Support
- 7) House & Rizzo (1972b) Supportive Practices
- 8) Campbell & Beaty (1971) Supportiveness

V. Cooperation vs. Conflict:

- 1) Payne & Pheysey (1971) BOCI Conflict vs. Cohesiveness
- 2) Litwin & Stringer (1968) Conflict
- 3) Schneider & Bartlett (1968) Intraagency Conflict

VI. Intelligence and Ability:

- 1) Stern (1970) OCI Intellectual Orientation; Organizational Effectiveness
- 2) Payne & Pheysey (1971) BOCI Progressiveness factor
- 3) Taylor & Bowers (1972) Technological Readiness
- 4) Campbell & Beaty (1971) Competence and Ability

VII. Achievement Emphasis:

- 1) Stern (1970) OCI Achievement Standards
- 2) Litwin & Stringer (1968) Standards
- 3) Campbell & Beaty (1971) Achievement Emphasis

VIII. Openness vs. Defensiveness

- 1) Taylor & Bowers (1972) Communications Flow
- 2) House & Rizzo (1972b) Effectiveness and Role Perceptions Inconsistency
- 3) Campbell & Beaty (1971) Openness vs. Defensiveness

IX. Risk Taking

- 1) Litwin & Stringer (1968) Risk
- 2) Campbell & Beaty (1971) Security vs. Risk

X. Participation vs. Decision Centralization

- 1) Taylor & Bowers (1972) Decision Making Practices and Lower Level Influence
- 2) Campbell & Beaty (1971) Decision Centralization

FIGURE 9 (Cont.)

XI. Training Emphasis

- 1) Schneider & Bartlett (1968) New Agent Concern
- 2) Campbell & Beaty (1971) Training Emphasis

There are certain weaknesses inherent in this summation. First, the Litwin and Stringer (1968) scales were generated a priori to assess variables relevant to Atkinson's need theory. While they presented some support for the theory, and were able to discriminate among simulated firms with different motive orientations, it is not clear that some dimensional analysis would not produce a considerably different substantive structure than the nine-dimension a priori configuration. This, however, may not present much of a problem, since, with the exception of one empirical dimension (Risk taking), at least two empirical scales have provided some support for each factor listed. The Campbell scales especially presented respondents with a large number of items generated from a large number of a priori dimensions but allowed the cluster analysis to reproduce more faithfully the complex of factors actually underlying employee perceptions of the work organization.

A more basic weakness lies in the almost exclusive use of perceptual climate data, and a heavy reliance on summated rating (Likert-type) scales. Stern's and Payne and Pheysey's true-false scales provide cross method validity for some empirical dimensions, and Pervin's (1967) finding of semantic differential factors similar to other educational climate dimensions further alleviates fears of a method related climate structure. Pugh, Hickson, Hinings, & Turner (1968) provide the only available multivariate analysis of an objective measure of climate-related variables. Their factor analysis of five indices of organizational structural variables produced four factors; two of which, Structuring of Activities and Concentration of Authority, appear similar to two of the empirically derived perceived dimensions (Structure and Decision Centralization). As reported earlier, however, Payne and Pheysey's (1971) BOCI was unable to differentiate between two firms (a small unstructured firm and a large highly structured firm) selected for their differences on these objective structural dimensions. Thus, little support is provided for a convergence of results from the two data collection methods.

* In general, however, the relationship between perceptual and objective measures of the organizational environment is unexplored, and little is known of how the latter impinge on actual behavior in organizations.

What relationships between climate and other variables have been explored, and what results have been obtained? Relationships between climate and measures of satisfaction (including absenteeism and turnover), productivity, and work quality have been tested. Significant positive correlations have consistently been reported between various climate dimensions and reported

satisfaction. Unfortunately, due to the diversity of climate dimensions employed, and due to a tendency to employ global climate indices (summed over scales), it is difficult to assess reliably the contributions of specific dimensions to satisfaction. Friedlander and Margulies (1969) found high correlations between satisfaction and Halpin and Croft's dimensions of Esprit (morale), negative Hindrance (focus on details, which we have included in Autonomy), and Thrust (group motivation through leader example). Significant correlations of climate with satisfaction (.30's) are reported by Hackman and Lawler (1971) for Task Variety, Autonomy, and Feedback, and moderate (.20's) relationships were found for Task Identity (ability to identify a piece of work as one's own) and Social Relationships. House and Rizzo (1972b) report moderate correlations between satisfaction and Supportiveness and Formalization (Structure), (median r 's .23, and .25 respectively). Pritchard and Karasick (1973) employing some of Campbell's a priori climate dimensions found 10 of 11 scales significantly correlated with individual satisfaction ratings, notably: Reward level ($r = .66$), Achievement Emphasis ($r = .65$), Supportiveness ($r = .52$), Social Relations ($r = .51$), and Reward-performance contingency ($r = .50$). Autonomy, Social Relationships, and Supportiveness seem to recur as dimensions relevant to satisfaction, although, again, only two studies (Campbell & Beaty, 1971; Pritchard & Karasick, 1973) even tested for a Rewards-Satisfaction relation. Hackman and Lawler (1971) did, and Pritchard and Karasick (1973) did not find needs interacting with climate to influence satisfaction.

Performance-climate relationships are more tenuous. Taylor and Bowers (1972) found negative relationships between their global climate index and production costs, but no climate relationship for product quality. Friedlander and Greenberg (1971) report positive correlations between Supportiveness and supervisor ratings of employee ability and performance, but supervisors' ratings are probably confounded with supervisors' supportiveness, and no objective performance criteria were included in the analysis. Hackman and Lawler (1971) obtained correlations of .20 and .26 respectively between supervisor ratings of performance and Task Variety and Autonomy. Pritchard and Karasick (1973) found low correlations (.25) between individual workers' performance ratings and Achievement Emphasis and Reward Level, but the performance ratings were made by two "expert management consultants" from outside the firm, and involved only 19 workers. Neither Hackman and Lawler nor Pritchard and Karasick found a need strength-climate interaction for performance, implying that the person-environment fit model was not operating in these data. Campbell and Beaty (1971) found that employee ratings of Decision Delegation vs. Centralization, Openness vs. Defensiveness, and Recognition and Feedback correlated positively with rated work group performance. Employee perceptions of Work Group Reputation correlated negatively with performance. Supervisors' ratings of Achievement Emphasis, Security vs. Risk, Openness, Organizational Morale, Recognition, Training Emphasis and Supportiveness correlated positively with work group performance ratings.

Finally, in a laboratory experiment using simulated organizations, Litwin and Stringer (1968) found that leader behaviors producing a press for achievement resulted in greater productivity and innovation than did press for power or affiliation. Another laboratory experiment which tried to study the effects of climate on individual performance is reported in elaborate detail by Frederiksen, Jensen, Beaton, and Bloxom (1972). Middle managers employed by the State of California worked through an In-basket test designed to simulate the job of the field service division of the Department of Commerce. Four treatment combinations designed to create differences in climate were arranged in a 2 by 2 design. One treatment dichotomy had to do with the general prevalence of "rules and regulations". Half the subjects were informed via instructions and In-basket materials that the Department of Commerce encouraged new ideas, innovation, and creative problem solving. They were told that rules existed but that they could be broken if they got in the way. The other half were told that a very substantial set of rules and regulations had been built up over the years and had proved very valuable and that they were not to be violated except under extreme circumstances. The second treatment factor was concerned with the closeness of supervision, and the subjects were told either that the organization preferred a subordinates' work to be closely monitored or that subordinates should be allowed to work out details for themselves.

The In-basket can be scored on a large number of indices (e.g., explains action to peers, postpones decision, involves subordinates, and takes final action). Sixty of these initial scores were reduced to a small number of first-order factors, and a major dependent variable in this particular study was a second-order factor labeled "productivity", or the sheer amount of work accomplished. The subjects also provided a large amount of test and biographical data which served as 21 different predictor variables. In general, it was found that predictability was higher under the innovative climate.

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

In further analyses it was demonstrated that inconsistent climates also have a negative effect on productivity. Specifically, those subjects who were placed in a climate that encouraged innovation and was at the same time characterized by detailed supervision worked at a substantially reduced level of output. Digging still deeper in the data, Frederiksen et al. were able to show that subjects employed different work methods under different climate conditions. For example, in the In-basket under the climate conditions permitting more freedom, administrators dealt more directly with peers, while in the restrictive climates, they tended to work through more formal channels.

Integration of all these results is stymied by a low correspondence among both the climate dimensions assessed, and the performance measures used. We are still not to the point where we can conclude that distinct facets of

organizational climate can be reliably measured with significant discriminate validity and measures of organizational climate add a large amount of explanatory variance over and above that provided by a general measure of job satisfaction. However, the current scene is promising enough to recommend that research continue. There appears to be a growing convergence relative to taxonomies of climate facets. The individual/environment fit hypotheses remains intriguing; and both the correlational field study by Campbell and Beaty (1971) and the laboratory studies of Litwin and Stringer (1968) and Frederiksen et al. (1972) suggest that organizational climate may yet prove to be an intervening variable that can be used to explain certain aspects of organizational performance and effectiveness.

VII. ORGANIZATIONAL STRUCTURE

Properties of an organization pertaining to its structure constitute the second major class of variables that we have chosen tentatively to label as one of the "givens". The literature surrounding organizational structure is also huge and we do not intend to deal with all of it. Again, however, our goal is to be exhaustive in terms of what's known about the relationship of structure to effectiveness.

Structural vs. Structuring vs. Climate Characteristics

Much of the existing literature on organizational structure deals with the organizational attributes specified by Weber (1947) as defining bureaucracy. For example, Hall (1962) investigates such organizational properties as specialization, centralization, standardization, and formalization. However, these properties are measured through the perceptions of organizational members and thus can perhaps be thought of as aspects of an organization's climate, rather than its structure. While Hall's work clearly conforms to our definition of climate assessment, other organizational investigators have mixed a concern for organizational climate with a concern for the actual structure of the organization and referred to the whole thing as "structure". It's a bit confusing at times to distinguish between these two possible uses of the terms organizational structure. We offer the alternative terms of "structuring" and "structural" characteristics of an organization.

"Structuring" refers to those behaviors or activities occurring within an organization which restrict the range of behaviors open to role incumbents. Examples of organizational structuring are the degree to which decision making is centralized or dispersed in the organization, or the degree to which members' behavior is prescribed by a set of formal or informal standards or procedures.

Contrasted with these structuring behaviors within the organization are its "structural" qualities--the physical characteristics of the organization--(e.g., its size, shape, number of management levels, etc.) which define the context within which role behavior occurs, and which might influence the nature of this behavior.

Most investigators and theorists assume that structural factors strongly influence climate, and interact with the nature of the organizational tasks, technology, environment, etc., to affect performance.

The major differences between investigations of structuring and those of climate are matters of focus rather than methodology. Climate investigators assess the characteristics of an organization or subunit, either through member perceptions or by other presumably more objective methods (e.g., Astin

& Holland, 1961), and then, typically, attempt to relate organizational characteristics to individual member behaviors. Thus, the typical "climate" approach typically regards the individual as the unit of analysis, and considers the organization to comprise the relevant environment within which to predict behavior.

Investigators of structuring likewise assess their dimensions through perceptions (e.g., Hall, 1962), "objective" measures (e.g., Pugh, Hickson, Hinings, MacDonald, Turner, & Lupton, 1963), or a combination of the two (e.g., Aiken & Hage, 1966, 1968; Hage & Aiken, 1967a). The typical structure theorist is, however, a sociologist, rather than a psychologist, and the organization is the principal object of interest. Levels or patterns of structuring characteristics are used either singly, or in terms of interaction with the organization's goals, historical background, structural configuration, etc., to predict total organizational performance.

Few studies have been made contrasting structural and climate measures (exceptions are Payne & Mansfield, 1973; Payne & Pheysey, 1971; Pheysey, Payne, & Pugh, 1971). On the other hand, a reasonable mass of literature exists relating structural to structuring variables.

It is not always easy to classify the variables of some researchers into our structural/structuring/climate framework, largely because the variables employed are often composites of both structural and perceived climate items. Nevertheless, we shall plow ahead and try to summarize what is known about the relationship of the two types of structure variables to organizational effectiveness.

Interrelationships Among Structural and Climate Variables

To understand fully the effects of organization structure characteristics on effectiveness, it is first necessary to explicate the interrelationships among the different attributes themselves. The variables which have most frequently been studied under the label of organizational structure are listed and defined in Table 18, where they have been divided into our climate-structure (or structuring-structural) categories.

Not all these variables have been tested for interrelationships with all others and some pairs that have been tested have produced quite inconsistent results, over different studies, organizational settings, and operationalizations. Thus, for example, three researchers have investigated the correlation between organization size and the proportion of employees who are support personnel (e.g., staff, clerical, or administrative) rather than work flow personnel. Of the three correlations, one was significantly positive, one negative, and one zero. In this section we shall report on those relationships which have appeared to be reasonably consistent over at least two studies.

One set of highly interrelated organizational variables comes from the work of Pugh, Payne, and others in the Aston series of studies. Investigations in five different samples of organizations (Child, 1972b; Hinings & Lee, 1971; Payne & Mansfield, 1973; Pugh, Hickson, Hinings & Turner, 1968, 1969) have strongly indicated high positive correlations among the variables organization size, total number of different specialties, vertical span, formalization, and standardization. Pugh et al. (1968, 1969) found that the highly intercorrelated measures of specialization, vertical span, formalization, and standardization formed a single principal components factor which correlated strongly with organization size.

TABLE 18
VARIABLES OF ORGANIZATIONAL STRUCTURE

<u>Structural Variables</u>	<u>Definition</u>
1. Number of specialties	Number of different occupational titles or different functional activities pursued within an organization.
2. Size	Number of organization members.
3. Vertical span	Organizational height; number of hierarchical levels.
4. Hierarchical level	Level of respondent in organization hierarchy.
5. Span of control	Number of subordinates supervised by a single superior. Variously operationalized as number of direct subordinates, total number of hierarchical subordinates, or total number of members divided by total number of supervisory personnel.
6. Shape (tall vs. flat)	Concurrent consideration of vertical span and width of organization at its base. Tall organizations, regardless of total size, have many levels relative to the width of their bases.
7. Line vs. Staff membership	a) Line staff identification of respondent. b) Proportion of organization members who are staff (supportive, administrative, clerical) vs. line (direct production, or production supervisory) personnel.

TABLE 18 (Cont.)

<u>Structuring Variables</u>	<u>Definition</u>
1. Formalization	Either ratings of the degree to which appropriate behavior is prescribed in writing, or an actual count of the number of rules existing in similar organizations. No studies are available giving correlations between these two operationalizations.
2. Standardization	Degree to which member behavior is prescribed or otherwise limited, either formally or informally.
3. Decision centralization vs. participativeness	Degree to which decisions are made by persons at the top of the organization hierarchy vs. participation by all members in decision making.
4. Impersonality	Degree to which organization members are "objectified" or treated as mechanical role occupants, rather than as individuals.
5. Routineness of work	Degree of repetitiveness or "sameness" vs. variety perceived in one's work.
6. Professionalization	A complex variable, variously measured by amount of training, and identification with an independent professional body, and implying both expert knowledge or ability, and internalization of ethical norms.

Hinings and Lee (1971), Child (1972b), and Payne and Mansfield (1973) all report strong positive interrelationships among these Aston measures and a negative correlation between decision centralization and specialization, and a negative correlation between centralization and size. In addition, Hinings and Lee (1971) and Child (1972b) found negative correlations between reported centralization and formalization, and between centralization and standardization. Child suggests that Pugh et al.'s (1968) failure to obtain the latter two correlations was an artifact of his sample of organizations. Pugh et al.'s sample included a large proportion of subsidiary factories in which the plant manager, while possessing considerable authority within his own unit, nevertheless was fairly low in the total organizational hierarchy.

Pugh et al. described such managers as overseeing a total organization rather than a "workflow subunit". Child contends that this artificially inflated the centralization scores for these subsidiary organizations, masking the correlations with standardization and formalization. Child's (1972b) sample included no branch organizations, and Hinings and Lee's (1971) organizations were all subsidiaries, and thus this factor of dependency was not varying to confound the relationship of centralization to other structure factors. At this point, it seems reasonable to conclude that centralization correlates negatively with specialization, standardization and formalization, with the cluster representing a bipolar set of alternative control strategies. Organization members can be controlled either by restricting decision making power to a few central administrators, or by standardizing behavior, formally or informally, and permitting individuals to exercise discretion within the limits set by standard policy. Specialization and size imply a complexity exceeding the capacity of the centralized decision maker, and hence require decentralization. On the other hand, formalized or informal standards are likely to be used in restricting discretion in large or highly specialized organizations.

Many of these findings have been duplicated by other investigators, using different measures in organizations differing from the Aston group's primarily industrial business firms.

Hall, Haas, and Johnson (1967) investigated the relationship of size to various structure variables in 75 divergent organizations, and found size related to specialization, formalization, and vertical span. Anderson and Warkov (1961) in a study of 49 Veterans Administration hospitals found size related to "complexity", a dichotomized measure of the number of functions performed by the hospitals. Blau, Heydebrand, and Stauffer (1966) found the size of 156 public personnel agencies related to the number of organizational specialties, but Blau et al. found no relationships between size and centralization. The Aston investigators have consistently found strong negative correlations here.

Samuel and Mannheim (1970) found size related to formalization, but not to specialization. Samuel and Mannheim's specialization measure was confounded with required training, or professionalization and perhaps this partially explains their failure to find a relationship with size.

Other studies offer little clarification of the relation between centralization and the other variables studied by the Aston investigators. Contrary to the Aston group's consistent report of negative correlations between centralization and specialization, Hage and Aiken (1967a) found no relationship between these two variables. Where Aston investigators have found zero or negative relationships between standardization and centralization, Hall (1963) reports a positive correlation. Similarly, Hall (1963) found centralization positively related to his measure of specialization, again in contrast to Aston's negative or zero findings. Hall, however, does provide some

support for a positive correlation between standardization and specialization, and between specialization and formalization.

All of Hall's measures are derived from ratings by organizational members. Although the relationship between such perceptual (climate) measures and their more objective alternatives has not yet been systematically explored, perhaps an indication of the differences between the two methods will arise from comparing Hall's specialization and formalization rating scales with similar scales derived from organizational records by the Aston investigators. Hall's specialization ratings and various objective measures of specialization were both compared with three other variables, rated formalization, centralization, and standardization. Both perceived and objective specialization correlated positively with standardization and zero with formalization. Objective specialization correlated primarily negatively with centralization, while Hall's rated specialization correlated positively with centralization. Rated and objective formalization were tested for relationships with four common variables: number of specialties, centralization, standardization, and routineness of work. None of the resulting pairs of correlations were in the same direction, all four changing from positive or negative to zero in going from objective to perceptual measures.

A second cluster of interrelated structure variables has been supported by the research of a number of investigators, but especially Hall (1962, 1963), Hage and Aiken (1967a, 1969), Child (1973), and Payne and Mansfield (1973). The variables in this cluster include the hierarchical level of the respondent, centralization, impersonality, and the routineness of work.

Both Hall (1962) and Bonjean and Grimes (1970) found that hierarchical level correlated negatively with ratings of standardization, centralization, and impersonality within the organization. Payne and Mansfield (1973) also report negative correlations for hierarchical level with centralization and with impersonality. In a study by Blankenship and Miles (1968), higher level managers reported a greater tendency to consult with their own subordinates in making decisions, indicating again, a negative correlation between centralization and organization level.

Hall (1963) found impersonality correlated positively with centralization. Similarly, both Hage and Aiken (1969) and Child (1973) report positive correlations between centralization and rated routineness. This cluster appears to have some substantive commonality, reflecting a perception of impersonality and routineness in situations where members are permitted little discretion in a standardized organization with a centralized decision making process. Predictably, members in higher levels perceive fewer constraints on their behavior, and feel more personally involved in their work.

The third cluster of interrelated structure variables which emerges from the literature has less support. Two studies have indicated a negative correlation between the degree of professionalization of the work force, and the typical span of control of an organization or subunit. The major

finding of Blau et al. (1966) was a strong positive relationship between the proportion of personnel in 156 public personnel agencies who were required to possess college degrees in specified areas, and the ratio of managers to nonsupervisory personnel. Blau et al. hypothesized that this reflects a need to facilitate communications between professionals and managers, and among professionals in different areas of specialization. The sequential filtering of communications across levels of a tall, narrow hierarchy permits the professional-scientist's technical terminology to be translated into a language more meaningful to an administrator, and allows general administrative directives to be translated into specific technical recommendations for the professional. Presumably, the more esoteric the profession, the taller the hierarchy needed to mediate interactions with nonprofessionals, or with professionals in other fields.

Udell (1967) provides some support for such an hypothesis. He correlated supervisors' spans of controls with the experience and education levels of their subordinates, and found that subordinate experience correlated positively, and education negatively with span of control. The correlation with experience suggests that knowledgeable employees need less supervision, but a different process appears to be at work in the case of education. One plausible explanation is Blau's hypothesis of the need for a narrow hierarchical chain to mediate professionals' communications with the rest of the organization.

In summary, three relatively independent clusters of interrelated structural and structuring variables have appeared in the organization literature to date.

First, extensive support exists for a strong positive relationship among specialization, size, vertical span, formalization, and standardization. This cluster appears to reflect a need for more impersonal control over member behavior as the organization grows larger, taller, and more functionally complex. Decision centralization may be negatively related to the cluster, as an alternative control strategy in smaller, simpler organizations, but this relationship is less well supported.

Second, centralization, impersonality, and routineness are positively interrelated, and are all negatively related to the hierarchical level of the respondent. This cluster reflects a perception of routineness and lack of personal involvement among lower level members of highly centralized organizations, and a perception of increasing involvement and variation in work as one climbs the hierarchical ladder.

The third cluster is defined by a negative relationship between the degree of professionalization and span of control. It is hypothesized that highly professional employees require a long hierarchical chain of command to mediate communications with less specialized management personnel, and with other professionals in different fields. Non-professional employees typically enjoy larger control spans as they increase in competence.

The Relationship of Structure to Organizational Effectiveness

Even though there is a large literature associated with organization structure we should again point out that only a small percentage of it deals with the influence of elements of structure on effectiveness. It is a frustrating experience to attempt to separate this portion from the total. What we have done is to approach the topic from two different directions. First, we would like to discuss the major programmatic approaches. That is, the discussion will be focused around a group of researchers or theorists pursuing a particular approach. Second, we would like to follow the original Porter and Lawler (1965) categorization and discuss some recent findings variable by variable.

Programmatic Approaches to Structure, Technology, and Effectiveness

The Aston Group

The program of organizational research being carried out by the Aston group in England (Aldrich, 1972; Child, 1972a, 1972b, 1973; Child & Mansfield, 1973; Hickson, Pugh, & Pheysey, 1969; Hinings & Lee, 1971; Inkson, Pugh, & Hickson, 1970; Payne & Mansfield, 1973; Payne & Pheysey, 1971; Pheysey, Payne & Pugh, 1971; Pugh, Hickson, & Hinings, 1969; Pugh, Hickson, Hinings, MacDonald, Turner, & Lupton, 1963; Pugh, Hickson, Hinings, & Turner, 1968, 1969) is intended to investigate the effects of environmental and organizational characteristics on performance at the individual, group, and organizational levels. Their most significant contribution to date is an analysis of the dimensions underlying organizational structure, and the environmental contexts of organizations (Pugh, Hickson, Hinings, & Turner, 1968, 1969).

Nearly all of the Aston structure scales were derived factor analytically and contain both structural and structuring data (Pugh, Hickson, Hinings, & Turner, 1968). Even the centralization scale which after successive analyses emerges as purely a structuring dimension, uses only the perceptions of the top organization executive to estimate decision centralization. Considering the inter-level differences in climate perceptions found by Hall (1962) and Schneider and Bartlett (1970), the comparability of the Aston centralization measure with other perceptual indices of centralization is dubious.

As yet, published studies using the Aston measures have not reported a systematic investigation of relationships with effectiveness variables. Child (1973), however, does report some correlations between the Aston structure factors and several organizational outcomes for a group of high level executives in 78 British firms. He found a positive correlation between perceived intra-organizational conflict and the Aston "structuring of activities" dimension, which is a derived factor score made up of the individual structuring components of specialization, standardization and formalization, and by the structural characteristic labeled vertical span

(i.e., the number of hierarchical levels). Child also found a negative correlation between the Aston centralization factor (a structuring variable) and executives' attitudes toward innovation or nonconformity; and a negative relationship between perceived routineness (structuring) and perceived innovation and nonconformity.

Pheysey, Payne, and Pugh (1971) report some data indicating that contrary to expectations, the members of a highly structured and centralized firm had higher ratings on several satisfaction measures than did members of a less structured organization of the same size. The limited sample (N = 2 organizations) prevents a meaningful interpretation of this result, however, as other than a simple case study of limited generalizability.

Woodward vs. Aston

Woodward (1965) contends that technological factors largely determine which structural patterns will appear in an organization and strongly influence the attempt to classify manufacturing organizations on the basis of important technological differences. Woodward assessed technology in terms of 11 categories of production methods. Nine of these categories seemed to form a loose continuum ranging from custom crafting of individual pieces, to assembly of large custom pieces, to intermittent or batch production, to continuous or mass production of identical units, to intermittent and continuous flow production of fluid or granular output. Woodward trichotomized this 9 category distribution into (a) unit and small batch systems, (b) large batch and mass systems, and (c) process systems. The two left-over categories consisted of combinations systems. One of them entailed a situation where parts were batch produced but then custom assembled, and the other was a situation where substances were process produced and then packaged or bottled by mass or batch techniques.

The outstanding feature of the 9-category continuum is the apparent increase in the technical complexity of production methods from unit to mass to process systems. The scale seemed to form a developmental sequence as well, since nearly all observed technical changes were in the direction of greater technical complexity (Woodward, 1965, p. 47).

In a study of 100 British firms, Woodward found that as the technical complexity of the operations performed on raw materials increased, certain structural characteristics varied in a predictable manner. Thus, as the complexity of operations increased from unit, to mass, to process production systems, the number of hierarchical levels and the ratio of white collar to blue collar workers increased, while the average span of control, and the ratio of line to staff workers decreased. The pattern is one of increasing specialization, and professionalization, and the finding of taller organizations with a smaller average span of control is consistent with Blau, Heydebrand, and Stauffer's (1966) data. Woodward also found

that some structural and climate factors were curvilinearly related to technical complexity. First level supervisors' span of control, emphasis on formal, written communications, and the degree of distinction maintained between "line" and "staff" functions were all higher for the middle range of complexity (Woodward's large batch and mass production firms) than for the extremes (unit and process firms). The ratio of skilled to unskilled workers, and the use of "organic" vs. "mechanistic" management practices (Burns & Stalker, 1961) are higher at the extremes of the distribution. Here the picture is one of highly skilled workers (either craftsmen or professionals) at the extremes, requiring little supervision, and unskilled workers in closely supervised highly structured jobs at the middle of the complexity distribution.

Significantly, no relationship appeared between level of technical complexity and organization size. This may be due to the extreme positive skewness of the distribution of Woodward's organizations on size (see Table 19) and is inconsistent with data reported by Hickson, Pugh, and Pheysey (1969).

TABLE 19
DISTRIBUTION OF ORGANIZATION SIZE IN ASTON AND WOODWARD SAMPLES

Sample	Size							
	100-250		250-500		500-2000		> 2000	
	No.	%	No.	%	No.	%	No.	%
Aston	0	0	16	35%	16	35%	14	30%
Woodward	35	38%	22-25	25%	21-26	25%	9-11	12%

Range: Aston 250-25,000
Woodward 100-40,000

Woodward's most important finding was an apparent relationship between structure and organizational effectiveness. Although technical complexity per se showed no systematic covariation with performance, it did, as we have seen, correlate with certain structural characteristics, and these structural factors are related to performance for each level or category of complexity.

Within each of the three complexity levels, firms rated as above average in success clustered around the median values on the structural variables, while less successful firms tended to score somewhat above or below the median. Thus highly successful unit and small batch firms had first line spans of control ranging from 20 to 40, while less successful firms had first level control spans of less than 20 or greater than 40. For large batch and mass firms, foremen in successful firms had 40 to 60 immediate subordinates, while for less successful firms, the corresponding figures were, again, more extreme. Woodward reports similar trends for the number of hierarchical levels, for the proportional cost of labor, and for all the labor ratios (line to staff, white collar to blue collar, etc.).

Confidence in these results is tempered by Woodward's omission of actual data for any variables except first line span of control. Also, the "successful" and "unsuccessful" firms which are differentiated represent only about the top and bottom fifths of the performance distribution. The fit between structure and technology is able to distinguish very successful from very unsuccessful firms, but apparently is less efficient in separating either group from the middle 60% of the distribution. Perhaps we can predict the degree of technology-structure match from performance data, but evidence is lacking that accurate predictions can be made in the opposite, more important direction.

This last conclusion is echoed by Child (1972a) who argues that technological factors set at most rather weak constraints on structure, and that the perceptions and preferences of important organizational decision makers will play a far more important role in determining an organization's structure than will technology.

Hickson, Pugh, and Pheysey (1969) using a different sample of firms, and slightly different operationalizations of structural variables from Woodward's, were unable to replicate her technology-structure correlations and thus cast doubt on the validity of her technology-structure-effectiveness relationships. The differences in the structural indices, and minor changes in the complexity measure used may account for Hickson et al.'s negative results, although such a lack of robustness is not promising for a pervasive effect of technology and structure on performance. Hickson et al. did find a sizable correlation (.47, $p < .01$) between technological complexity (Hickson et al. called it continuity of production) and organizational size, with larger firms more likely to employ continuous flow mass or process technologies, rather than unit or batch systems with intermittent runs. Hickson et al., unfortunately, do not provide effectiveness data, so it is impossible to assess the effects, if any, of technology and structure on performance in their sample.

Perrow

Perrow (1967) also attempted to relate technological variables to the amount and type of behavioral structuring occurring in an organization. He arranged

technologies on a continuum from those typically encountering routine events to those facing unpredictable variations in the course of production. Routineness is determined largely by the stability and understandability of the raw materials used. This routineness dimension is hypothesized to be linearly and inversely related to the amount of structuring employed in an organization. Operationally, using Perrow's framework, one should tend to find centralized structural configurations, with large first level spans of control and a sharp split between line and staff at the routine end of the scale. At the nonroutine extreme of the distribution, a decentralized structure should prevail with highly skilled and relatively autonomous personnel. Also, a complex coordinating structure should exist to facilitate communications between narrowly focused specialities. The primary difference between Woodward's and Perrow's configurations is that Woodward distinguishes between crafts and professions within the nonroutine category. These groups are not differentiated by the variables showing curvilinear relationships with Woodward's complexity scale. However, the number of hierarchical levels, average span of control, and ratio of workflow to nonworkflow personnel do separate unit from process technological systems, and hence pull apart two groups that are confounded by Perrow's model. The major strength of Perrow's framework is its ability to account for the structuring characteristics of service and other non-industrial organizations, though Perrow has yet to demonstrate the empirical validity of his model's predictions for any organizational samples.

Although Perrow reviews several studies, including Woodward's, whose data are compatible with his model, his arguments are not convincing in the domain of manufacturing organizations. Here, as we have seen, Woodward's model is able to discriminate more finely among alternative technologies.

Perrow's framework, like Woodward's model, proposes that organizational effectiveness is related to the degree of fit between technology and structure. According to Perrow, structures inappropriate to technology produce "strong strains" in the organization which presumably impair performance. Perrow presents no data for organizations classified according to his framework, although he cites numerous studies whose results do not contradict his model. He does, however, admit the difficulty of operationalizing several of his constructs. In short, it very much remains to be seen whether Perrow's framework can offer even as much explanatory value as Woodward's at least operationalizable technological typology. Its ultimate worth can only be tested on an a priori investigation of several divergent real-life organizations.

Lawrence and Lorsch

Lawrence and Lorsch's (1967) environmental contingency theory is similar to Woodward's technology-structure model, save that the focus is

on the subunit rather than on the total organization. The environmental contingency theory predicts a relationship between organizational effectiveness, and certain patterns among several other variables, including some measures of structure. However, it is again difficult to single out any simple relationships between specific structural or structuring variables and performance, given the complex nature of the constructs in the contingency model. Lawrence and Lorsch describe the influence of environmental factors on an organization from a natural systems viewpoint. They contend that since organizations are required to interact with a diversity of relatively independent agents in their environments, members' limited capacities for dealing effectively with more than a few such environmental entities require the organization to specialize or differentiate, so that each functional subunit can focus more effectively on its own relevant sub-environment. However, according to Lawrence and Lorsch, the structure and climate of the subunit are determined, at least to a degree, by the nature of its subenvironment, so that units facing different subenvironments will develop dissimilar structural and behavioral characteristics which may impede communication and coordination between these subunits.

Lawrence and Lorsch (1967) present evidence that organizational units facing subenvironments which differ in (a) the degree of uncertainty of information obtained from the environment, (b) the length of time required to provide feedback on the result of organizational behavior, and (c) the rate of change in the environment, have more difficulty coordinating their activities than do subunits facing similar environments. In general, the amount of differentiation required in a firm is a function of the differences in the orientations of the subenvironments with which the organization must deal. Thus for organizations which face complex environments (e.g., the clothing industry has a relatively stable production technology, but a fast-changing design market) a high degree of departmental differentiation is a prerequisite to success. The effectiveness of an organization is a joint function of 1) the match between environmental uncertainty and internal differentiation, and 2) the skill with which integrative departments coordinate the activities of the diverse subunits. Lawrence and Lorsch assess the degree of differentiation by the difference between subunit profiles over four attributes: structure; task vs. social orientation; short, medium, or long range time orientation; and primary goal orientation (production, distribution, information generation, etc.). The "structure" dimension includes both structural (span of control, number of hierarchical levels to a manager superordinate over both subunits) and structuring (rated specificity of performance review; importance of formal rules) variables. Task vs. social orientation is a purely structuring or climate measure, and the other two dimensions, time orientation and goal orientation, don't appear relevant to either structure or climate. The relationship between organizational structure and an index of subunit differences between patterns of scores over these variables is not obvious, and yet it makes intuitive sense that the amount of differentiation among organizational subunits should be related to the shape, size, and horizontal division of an organization.

The exact nature of these relationships, and the effect of specific structural factors on performance as mediated by differentiation are as yet unexplored.

Weick (1969) and Thompson (1967, Chapter 6) also propose that organizational decentralization and unit autonomy are related to the degree of indeterminateness of the environment. Thompson, like Lawrence and Lorsch, invokes a concept of the degree of interdependence, or requisite integration, between differentiated functional areas. The greater the interdependence, the greater the need for coordination between the subunits, and hence the greater the pressure for an effective integrative function.

Child (1972a) points up two "weaknesses" of the environmental contingency theory of organization structure and performance. The first is that theorists such as Lawrence and Lorsch tend to emphasize the impact of the environment on structure to the exclusion of other factors, and that they tend to assume implicitly that the range of viable structures is relatively limited for a given environment. Child feels that while environmental factors may tend to favor a certain set of alternative structures, this set is sufficiently large that organizational decision makers will have a fair degree of latitude in setting organizational policy. Environmental constraints on structure, while present, are presumed to be relatively weak.

Child also criticizes the failure of environmental theorists to differentiate between environmental factors, and the perception and interpretation of these factors by organizational decision makers.

It is Child's contention that organizational structure is determined by neither environment nor technology directly, but by decisions made by powerful organization members, based on their personal preferences for structure, and based on their perceptions and evaluations of the desires of powerful environmental elements. Child hypothesizes that structure per se has only a limited effect on performance, and that unless managers mistakenly perceive a stronger relationship than actually exists, organization structure will be determined by preferences (e.g., a desire for greater personal control) or cost factors, rather than by environmental factors. In support of his hypotheses, Child cites the occurrence of structurally divergent but otherwise similar organizations with no apparent performance differences.

It is possible, however, that fallible managerial perceptions are merely the mechanisms through which the environmental contingency model operates. It is important to note that Lawrence and Lorsch's (1967) data are based upon managers' ratings, not objective environmental measures. Thus, the relationships they report among environmental variables, structure factors, and performance do reflect the perceptions and evaluations of organization decision makers, and Lawrence and Lorsch's results indicate that, at least within their sample of organizations, certain organizational characteristics

(including some structure variables) are related to performance. If managers seek to maximize performance, they may be compelled to move, through trial and error, to match structure with environment in a manner consistent with the environmental contingency model. Within the Lawrence and Lorsch sample, differently structured organizations exhibited different performance levels, and these differences were consistent with their model. Acceptance of the environmental contingency theory will depend on the ability of Lawrence and Lorsch, and other researchers, to replicate these initial results.

Project Management

Two alternatives to classical bureaucratic structure are project management and a related form, the matrix organization. In no sense do they view organization structure as an immutable given. Arising from the application of systems theory concepts to organizational control, project organization recognizes the high degree of interdependence of various organizational functions in developing and manufacturing complex products. Stewart (1965) lists at least three prerequisite conditions necessary to justify project organization. According to Stewart, when time constraints are stringent, when the project requires joint involvement from a variety of functional areas, or when the novelty of the project precludes falling back on traditional procedures for planning, development, and production, a classical hierarchical arrangement of roles will be inefficient in mediating conflicts among subunits. For such cases, several authors (Cleland, 1964; Kast & Rosenzweig, 1970; Stewart, 1965) have advocated organizing around the problem, rather than around functions. In its pure form, project organization involves a single project manager whose sole responsibility is to ensure project completion within time, quality, and cost specifications. Subordinate to the project manager is a project team, consisting of specialists from all functional areas involved in the project, formally assigned to the team for the duration of the project. This form offers several advantages over traditional organization. First, there is a single project manager responsible for the successful accomplishment of project goals. His visibility and centrality facilitate project-relevant communications within the organization, and with outside contractors and consumers. Second, the assignment of personnel directly to the project encourages identification with the task, rather than with functional divisions within the organization, and thus motivates cooperation rather than competition among different specialties within a project. Third, the direct association of the various functional specialties involved in the project permits earlier perception and resolution of interfunctional conflicts, again facilitated by an orientation toward task accomplishment rather than departmental chauvinism.

It seems relatively obvious that a firm organized solely around transitory projects would lack the stability and continuity to coordinate activities

over several concurrent and sequential projects. When project management is applied within the context of an existing functionally differentiated structure the combination is referred to as matrix organization. The functional division or department provides a common and ongoing base for the performance evaluation, training, coordination, and reassignment of division members. Much actual production activity is performed by rank and file workers under the direct supervision of the functional department manager, rather than the project manager. In a matrix organization, the project team, composed of members of all affected departments, develops fairly exact specifications for all product components, and sets deadlines for completing each stage. The functional department heads are responsible for meeting these production specifications but have complete freedom in selecting production methods. The degree of involvement of functional subunit personnel will vary depending on the nature of the project. A planning project requires little involvement from departmentally based rank and file workers, while a product development project would involve operatives as well as project team members.

Power and responsibility are shared in a matrix organization by the project manager and the functional manager, and to a large extent, the effectiveness of a project manager depends on his ability to interact successfully with a number of permanent functional managers who may resent and resist his authority. Cleland (1964) suggests that personal factors such as persuasive abilities may contribute more to a project manager's power than formal authority.

Stewart (1965) discusses three common threats to successfully implementing project management. First, insufficiently specifying the rights, responsibilities, and authority of the project manager relative to the ongoing organization managers inhibits his ability to mediate effectively in conflicts between departments. Project organization is most efficient in situations where task uncertainties require rapid decisions based on typically incomplete information. Ambiguities surrounding a project manager's decision-making authority undermine the support he requires from permanent functional managers. A second threat to project management is precisely this requirement of quick decisions based on relatively little information. Decision delays typically produce enormous production costs given the high degree of interdependence among subtasks and the expense of deadline overruns. Time, production cost, and product quality are the three major parameters of project performance and the project manager must be capable of making incisive and accurate decisions involving tradeoffs among these criteria. A third factor frequently contributing to a project's demise is related to the project manager's relatively ambiguous position in the organizational power structure. An inopportune intervention, or a lack of attention, by top management can undermine a project manager's tenuous authority, and hamper the project's performance.

For purposes of general enlightenment a project or matrix organization could be contrasted with a more classically structured organization on most of the dimensions of structure and climate listed in previous tables. Some speculations about how the comparisons might turn out are as follow.

Given the level of problem complexity and unfamiliarity required before a project organization is justified, most project teams are composed of fairly high level white collar or professional people employed in divergent specialties. Although pure project organization is intended to promote rapid communication among different disciplines without recourse to an extended hierarchical system, the stable functional differentiation of a matrix organization will probably prevent any reduction in the size of the administrative and clerical components of the organization. "Line" and "staff" roles in a matrix organization are shifted, with the cross-functional project team performing a horizontal task oriented or "line" function, and the vertically arranged functional divisions offering primarily supportive "staff" services. The impact of project organization on organization shape (tall vs. flat), typical span of control, and vertical span (number of hierarchical levels) is unclear, although again a matrix organization may be viewed as a traditional hierarchical structure with interdepartmental project teams superimposed.

Regarding structuring variables, we would expect professionalization to be higher, and formalization, decision centralization, standardization, routineness, and probably impersonality to be lower in a project or matrix organization than in a classically structured organization. Low formalization, standardization, and routineness, and high professionalization are similar to the criteria specified by Stewart as indicating a need for a project oriented structure.

Regarding organizational climate, one might expect interesting differences between project oriented and traditionally organized firms in the dimensions of cooperation vs. conflict, and openness vs. defensiveness. We would expect greater interdivisional cooperation and openness within projects, as team members focus on their common task rather than their competitive organizational positions. Alternatively, some conflict and defensiveness are expected between project managers and functional managers, since the latter still maintain a more competitive attitude, and will likely feel a need to protect their power domains from unwarranted intervention by the project manager.

On the basis of these structure and climate differences and from the assumptions and projections of matrix management proponents, what benefits might be expected to be derived from an orientation toward projects rather than functions? First, we might expect project management to be more efficient than traditional structures in limited run, highly complex, unfamiliar projects with potentially high development and production costs. If identification of team members is successfully shifted from functional roles to the project task itself, we would expect more interdisciplinary

cooperation within teams, and greater individual satisfaction with successful task accomplishment in project organizations. Second, we would expect some conflict and defensiveness to arise in relationships between project managers and functional department heads, but it is doubtful that the negative effects of such conflict would override the benefits of intra-project cooperation. Third, various climate studies suggest that reductions in the degree of structuring of member behaviors should lead to greater team member satisfaction under the project structure. Fourth, the weak link in project organization is the project manager. Given his central role in coordinating the planning and production activities of a wide range of technical specialists, his technical knowledge, interpersonal skills, and organizing abilities must be extensive. He must command sufficient respect within the organization to elicit the cooperation of existing executives whose personal and departmental interests may run counter to those of the project. Since the project manager must devote full time to the project his role cannot be filled from any executive position vital to the organization, and candidates typically come from middle management levels, with little experience in coordinating a range of differentiated functions. Until experience has developed a pool of proven potential managers, no clear guidelines exist for selecting project leaders.

In sum, if proficient managers can be found, project and matrix management appear to hold considerable promise in facilitating task-related communications, and in aligning members' goals more closely with those of the organization as a whole, rather than with a functional subunit.

In organizations, such as those in the aerospace industry, which face demands for limited runs of highly specialized equipment in a rapidly changing technology, project and matrix organizations have seemingly proved highly effective (Johnson, Kast, & Rosenzweig, 1967, ch. 7).

We found no empirical studies comparing the performance of project and traditional organization structures. One study (Goodman, 1970) did, however, assess the organization design preferences of 23 project managers, and 23 organization general managers in 22 project and 24 matrix defense production organizations. Goodman found, perhaps predictably, that project managers preferred project designs, and general managers preferred matrix designs for large (in terms of size of contract) research and development projects. Interestingly, the general managers reported giving much more consideration, in making their preference decisions, to the flexibility of staffing possible in a matrix organization, where a single functional manager evaluates and remains familiar with the performance of all his subordinates. The general and project managers were asked to rank three organizational designs, project, matrix, and traditional or line-staff, on eight criteria: clear location of responsibility, quality of communications, cost control, adequacy of supervision, staffing flexibility, adaptability, ability to evaluate personnel, and

ability to provide members a clear promotion path. A summary of the rankings overall criteria indicated project managers perceived project organizations as potentially most effective, followed by matrix and finally line-staff organizations. General managers' summary ranking showed no significant differences in perceived effectiveness for the three organization types, although the rank order was the same as the project managers'.

In unstructured interviews on the alternative organization forms, Goodman's managers agreed that a line-staff design was best for an organization with a single, or stable product. Matrix design was judged best if a diversity of products demands both specialization and coordination. And project design was preferred for an organization facing a few very large projects. One factor deemed to be of importance in selecting an organization design involved the abilities and personalities of the personnel, again pointing up the crucial role of the personal attributes of the project manager in determining the effectiveness of project or matrix organizations.

Specific Structural Factors and Organizational Effectiveness

The most lucid and comprehensive variable by variable assessment of the effects of these structural factors on organizational outcomes is a review by Porter and Lawler (1965) relating organization structure to members' attitudes and behavior. We shall briefly review their findings for several structural variables, and attempt to bring the review up to date by citing relevant research published since 1964.

Organizational Level

Investigating the effects of the hierarchical level of the respondent in the organization, Porter and Lawler found evidence of a consistent increase in satisfaction from non-managerial to managerial positions, and from low to high level management. This conclusion is supported by Bonjean and Grimes (1970) who studied alienation in samples of salaried and hourly personnel in two industrial plants. Alienation was assessed in terms of perceptions of powerlessness; lack of influence over important social groups; normlessness, or failure to perceive clear and consistent norms; and job activities inconsistent with one's self-concept. Bonjean and Grimes found that higher level, salaried personnel perceived less alienation on all scales than rank and file employees from the same firms.

Ronan and Prien (1973) performed a correlational study of structural and performance variables. They found that the ratio of hourly to salary paid employees, an index of low vs. high organization level, correlated positively with the frequency of infirmary calls, group insurance claims, sick leaves, absences, grievances, and disciplinary actions taken against employees. These findings would seem to imply a greater health risk for

blue collar employees together with greater work avoidance behavior. The discipline and grievance correlations probably reflect the greater likelihood of formal grievance and disciplinary mechanisms for unionized blue collar workers than for salaried personnel.

Herman and Hulin (1972) performed a discriminant function analysis to determine what satisfaction factors differentiated among nonsupervisory, first level supervisory, and managerial employees. Rank and file employees tended to be less satisfied with the organization in general, than the two supervisory groups. First level supervisors, while high in general satisfaction, were less satisfied with line-staff relationships and with the quality of supportive (staff) services than were higher level supervisors. These patterns support Porter and Lawler's conclusion of consistently greater satisfaction in higher organizational levels.

In a series of studies to determine what job factors contribute to worker satisfaction, Blood and Hulin (1967; Hulin & Blood, 1968) found that white collar and blue collar workers reacted differently to such job characteristics as responsibility and autonomy. While white collar employees tended to respond favorably to attempts at job enrichment, those blue collar workers whom Blood and Hulin termed "alienated from middle class norms" reported greater satisfaction with simple noninvolving jobs. Thus, hierarchical level appears to be related not only to actual satisfaction, but to values or preferences for satisfiers as well.

Line-Staff

Porter and Lawler found some consistent differences in the attitudes and behaviors of line and staff personnel. Line workers were more satisfied than staff members, presumably because of the coincidence of high training and ability and low authority in staff personnel. Two studies reviewed by Porter and Lawler related line vs. staff positions to performance variables. One showed a turnover rate for staff personnel of 2-4 times that of line managers. The other reports staff managers are more informed of intra-organizational events, presumably because of their greater mobility.

Herman and Hulin (1972) found that staff members without supervisory responsibility had lower overall satisfaction, and were less satisfied with supervisor-subordinate relations than line personnel. They were, however, more satisfied with line-staff relationships than were line personnel.

Span of Control

Porter and Lawler found no studies providing data on the relationship between span of control and employee attitudes. The major writer on the subject (Worthy, 1950) contends that large spans of control preclude close supervision, and thus should enhance autonomy and satisfaction. Some

support for this position is offered by Blankenship and Miles (1968) who found that managerial span of control was directly related to perceived reliance on subordinates to initiate and contribute to organizational decision making. Blau and his associates (Blau, 1968; Blau, Heydebrand, & Stauffer, 1968; Meyer, 1968) conclude precisely the opposite; they found that span of control was negatively related to the expertise, and presumably to the autonomy of the work force. Their data suggest that professional personnel, while requiring little supervision, need an extensive communications network to facilitate interaction with other professionals and with management. A tall hierarchy, becoming less professionally specialized and more management oriented as it nears the top, would permit the interaction and coordination of different professional disciplines. The greater the number of specialties, the greater the intensity of specialization, and the larger the differences between specialties, the higher the management structure necessary to mediate between the two most disparate professions.² Blau, then, contends that a large span of control is related to centralized decision making rather than autonomy. He feels that decisions and orders can be easily transmitted downward through a few wide hierarchical levels, while the tall narrow structures he found in professional organizations impede a rapid downward flow of directives. This contention, however, is again contradicted by the results of Blankenship and Miles (1968), and by Pugh et al. (1968) who found decision centralization negatively related to the average work flow span of control. The dilemma can perhaps be resolved by posing different processes affecting the structure of professional and non-professional departments and organizations. Within professionalized organizations with self-motivated members, we would expect a tall and narrow hierarchy to facilitate communications, but not to control behavior. The existence of such a structure should be related to satisfaction among professionals. In non-professional organizations, with behavior controlled externally by fragmented, simplified jobs, and close supervision, we would expect a more classical configuration, with relatively narrow control spans, and workers preferring wider spans and greater autonomy from supervision. Such a dual process is indicated in a study by Udell (1967). He found that while employees' education level (professionalization) was negatively related to span of control, the experience of primarily nonprofessional members, and supervisory perceptions of members' ability were positively related to control span. This is consistent with an increasing control span for nonprofessionals with increasing competence.

Porter and Lawler cite Woodward (1958) as the only study relating span of control to performance. Recall that Woodward classified firms as unit, mass, or process technical systems, and that within each category, high producing firms scored near the median value for first level span of control, while low scoring firms fell at the extremes of the distribution. Although she presented no data, Woodward (1965) reported similar

²This bears an obvious relation to Lawrence and Lorsch's (1967) concept of a formal integrative function, mediating between differentiated specialties.

relationships for the chief executive's span of control, and for the supervisor: subordinate ratio, or (inverse) overall span of control. Recall also that Woodward was only able to discriminate between the top and bottom fifths of the performance distribution, presumably with little predictive efficiency in the middle performance range.

Ronan and Prien (1973) found no relationship between departmental span of control and production costs, turnover, time lost for accidents, injury or sickness, absenteeism, tardiness, grievances, or disciplinary actions.

Any relationships among control span, satisfaction, and performance may be contingent upon other variables such as hierarchical level or professionalization. Woodward (1965) for example, found that control spans of executives, managers, and first line supervisors varied greatly in their relationships with her technological complexity measure. Average span of control (ratio of total personnel to supervisory personnel) and span of control of middle level managers were both negatively related to technical complexity. Chief executives' span of control, on the other hand, was positively related to technical complexity, and first level supervisory control span had a curvilinear relationship, with unit and process organizations exhibiting a small span, and mass production firms showing a large first level control span. Given even Woodward's weak relationship of these structural variables to performance, it seems clear that span of control has no simple relation with organizational effectiveness, in terms of either satisfaction, or other more production oriented variables.

Size

Porter and Lawler attempted to differentiate between the effects of total organization size and subunit size on organizational outcomes. While this appears to be a reasonable distinction, the value seems lost in Porter and Lawler's application. They define a subunit as, "any grouping of the members of a business organization that systematically excludes part of the membership of that organization", including "primary work groups and factories (in multifactory companies)". This definition results in some "subunits" (entire factories) with far more members than some total organizations. A better concept of total organization is as much of the firm as a worker comes in contact with, or is aware of, in a typical work day. "Subunit" must be defined in terms either of a work group, or unit in which primary personal interaction among most members is typical, or of some organizational subdivision with which the member identifies closely, but existing within a more or less contiguous total organization.

Porter and Lawler's review of both subunits and total organizations indicates a consistent negative relationship between organization size and satisfaction for blue collar workers. The only study presented for managerial workers indicates that satisfaction is related to an interaction

between size and managerial level--lower level managers were more satisfied in small than in large firms, while higher level managers in large organizations were more satisfied than those in small firms.

With respect to behavioral outcomes of size, Porter and Lawler found consistent evidence of a positive correlation between organization size and absenteeism, turnover, and number of labor disputes for blue collar workers. Inconsistent relationships were reported for accident rates and productivity. Size and accident rate seemed positively related in the absence of a formal safety program. Productivity does not seem to be consistently dependent upon either organization or subunit size.

Ronan and Prien (1973) found that organization size correlated only with the rate of turnover in salaried personnel. No relationship was found for costs, earnings, accidents and injuries, tardiness and absenteeism, grievance rate, disciplinary actions, or hourly personnel turnover.

Child (1973) found organization size unrelated to either reported innovativeness, or perceived conflict in 78 British firms.

Blau et al. (1966) reported an interaction between size and specialization in predicting costs in 250 public health organizations. Large agencies with few distinct occupational specialties had lower average labor costs than did small nonspecialized agencies. Costs in agencies that were highly differentiated internally did not vary as a function of size. Thus, only non-specialized firms showed a return to scale as a result of increased size. Blau et al. hypothesize that a highly differentiated organization must either remain small or else maintain a much larger coordinating, administrative component than most of these agencies possessed. In agencies where a relatively large proportion of personnel were clerical (coordinating) workers, both differentiated and undifferentiated organizations showed lower costs with increasing size.

Shape - Tall vs. Flat

Porter and Lawler found only a few studies with data bearing on the joint effects of organizational height and width. Two studies showed that organization shape interacted with organizational size to determine satisfaction: low, flat structures yielded greater satisfaction in small firms (fewer than 5000 members) and tall, narrow structures produced greater satisfaction in large firms.

Carpenter (1971) found that teachers in low, flat-structured public school systems reported greater satisfaction with prestige, autonomy, and decision making responsibility than did teachers in tall narrow organizations. No differences were found for the satisfaction of security or personal growth needs.

Porter and Lawler cite one study relating organization shape to the publication rates of physiologists. Over all the firms, no relationship was found, but scientists in large tall organizations published more papers than those in large flat firms. This may, again, be compared with Blau et al.'s (1966) findings of greater cost-efficiency when high professionalism coincided with a tall hierarchical structure.

Role Specialization

One structural attribute which was not included in Porter and Lawler's review is the degree of specialization in an organization. As a rated, perceptual variable, this characteristic could reflect a climate dimension of task specificity, but measured by an actual count of the number of distinct formal positions or activities undertaken in an organization, specialization represents a structural characteristic, and would be especially related to the breadth of the organization at its base. As is the case with span of control, we would expect the theoretical and practical implications of different degrees of specialization to differ at different organizational levels, and over various degrees of professionalization. The fragmentation of jobs into minute, repetitive tasks for blue collar workers might have different implications for performance and satisfaction than would the differentiation among various professional disciplines.

Hage and Aiken (1967b) found that the number of occupational specialties was positively related to the amount of program change, or innovation, in 16 social welfare organizations. The personnel tested all were professional staff members.

As we discussed earlier, Blau, Heydebrand, and Stauffer (1966) found that in small but not in large public health organizations, a large number of specialties was associated with lower costs.

Child (1973) found specialization to be related to conflict within 78 business organizations. This finding should be considered in light of Lawrence and Lorsch's (1967) contention that differentiation or inter-departmental conflict is necessary for high productivity. Given a high level of conflict, the effectiveness of the organization should depend on the ability of integrating subunits to mediate between the various specialties.

Summary

Several factors seem to play an important role in determining the expected relationship between structural variables and organization outcomes. These include the type of organization (e.g., Woodward's technology/structure fit hypothesis applies only to some types of manufacturing organizations), the organizational level of the target group or subunit (e.g., Porter and

Lawler's different results in size-satisfaction relationships for different levels), and the degree of professionalization of the work force. Thus, we would like to focus our summary around these three factors.

First, regarding a summary of the results of studies on blue collar workers in industrial manufacturing organizations, it is apparent that the two organization characteristics most influencing our dependent variables are organization size and the hierarchical level of the respondent. Size was consistently found to be related positively to absences, turnover, and labor disputes, and negatively to worker satisfaction.

Blue collar vs. white collar membership is negatively related to satisfaction, and positively related to worker alienation, absenteeism, and possibly health hazards. There is some evidence for different job outcome preferences between blue and white collar workers, apparently related to a tendency for blue collar workers to reject some middle class achievement norms. Span of control was shown to be related weekly or not at all to performance and satisfaction variables in blue collar samples.

A second subsample within which structural and effectiveness variables have been related consists of white collar personnel in industrial organizations. Here research indicates higher satisfaction and lower turnover for line than for staff employees.

Size seems to interact with other variables in its effects on managerial outcomes. Porter and Lawler report that managerial satisfaction is related to both size and hierarchical level, with top executives preferring large organizations, and lower level managers preferring smaller firms. Likewise, managers in large firms preferred tall, narrow configurations, while those in relatively small organizations reported greater satisfaction if the firms had low, flat structures. Professionals in large tall organizations published more than those in large flat organizations, but there were no shape effects on performance for medium or small firms.

The third sample type involves primarily white collar professional people in service organizations. Here, size, professionalization, and specialization were found to be complexly related to costs and to innovation. Increased size was related to lower relative costs if specialization and professionalization were low, or if the organization possessed a large component of administrative, coordinating personnel. The number of job specialties was positively related to the rate of innovation, and to perceived conflict. Specialization correlated negatively with costs in small organizations, and in large organizations with a large administrative component. Finally, teachers reported lower satisfaction with prestige and autonomy in tall than in flat organizations.

In general, structural factors, like climate dimensions, appear to influence satisfaction and satisfaction related behaviors (absenteeism,

turnover) far more heavily than they do productivity variables, especially for blue collar workers. Organizational structural components can make rank and file members happy or unhappy but they don't seem to motivate them to work harder or to restrict production. The effect of structure on performance may be higher among professional personnel, where, as we have seen, a tall narrow structure seems to facilitate productivity if it is concerned with communication rather than control.

VIII. INDEPENDENT VARIABLES

As we have already become all too aware, identifying variables that we can label as dependent, independent, or something in between, vis-a-vis organizational functioning, is not particularly easy. What's one investigator's dependent variable is another investigator's independent variable. For example, in the study of organizations, measures of job satisfaction have played as many different explanatory roles as the scientific method has so far invented. Thus when we ask whether a particular characteristic plays the role of a dependent or an independent variable perhaps the only sensible answer is that "it depends".

One major factor upon which the distinction depends is the value system and the theory of effectiveness of the organization and/or the investigator. The moral here is clear. Both the organization and the investigator should know their value systems and differences between them should be recognized and dealt with in some fashion.

Aside from the value distinctions, however, there is a class of variables that historically have been treated as things to manipulate in hopes of producing a change in something else. They constitute recognizable handles to pull or dials to turn; as for example, the methods used to select new members for the organization, methods of payment, or various training or organization development methods. But even here the distinctions are not always clear cut. Within a particular value system, some methods of payment or some methods of selection (e.g., using or not using psychological tests) may be viewed as more desirable than others and to use the highly valued methods is to be viewed as an effective organization.

In spite of the definitional difficulties, we do wish to comment very briefly on methods that might possibly be used to effect changes in organizational functioning.

This category contains what is probably the bulk of the literature in industrial and organizational psychology and although tempting (sic), we do not wish to recount all of it. One thing that should be pointed out is that most of the research on these various "handles" has focused on individual behavior or performance as an independent variable. There are very few studies which have used organizational units as degrees of freedom, as for example in comparing various selection strategies or training methods, and these are so well known that we needn't burden the reader with a great deal of detail. Again, the work done at Michigan by the ISR group is the most notable exception and the principal independent variables which Likert, Bowers, and Seashore have used are primarily managerial interpersonal skills, communication methods, and participation in decision making. In their cross sectional studies of package delivery outlets (Georgopoulos & Tannenbaum, 1957) and insurance offices (Bowers

& Seashore, 1966) and in the longitudinal case study at Harwood Industries (Marrow, Bowers, & Seashore, 1967), these variables have tentatively been shown to have generally positive relationships with various measures of organizational effectiveness.

Beyond this there is not a great deal of organizational research that can be differentiated from individual research, which is too bad since many of these variables have been shown to be related to individual performance. The people who call themselves OD practitioners do indeed manipulate some of these variables in hopes of producing changes on some organizational dependent variables, but they tend to collect very little research data. The exceptions to this generalization are a relatively small number of data based studies such as that done by Blake, Mouton, Barnes, and Greiner (1964).

One thing that might be useful is to look at the list of independent variables with an eye towards the kinds of mechanisms by which they might exercise their effects. A list of such mechanisms might appear something as follows:

1. The aim could be to influence a unit or organization's choice of tasks or problems on which to work and the degree of effort expended once the choice is made. This is a so-called "motivational" consideration and involves task choice and task effort. Reward systems, job enrichment, and "team development" are methods of changing organizational functioning that appear to utilize, or attempt to utilize, this mechanism.
2. The aim might be to increase an organization's understanding of the task to be performed or problem to be solved. Instituting a computer assisted management information system or a management by objectives control procedure would seem to focus on this mechanism.
3. Another possible mechanism is to increase the organization's basic underlying aptitudes (e.g., select more competent people) for the task involved.
4. Another is to increase its specific task skills through some kind of training.
5. Finally, a change in the equipment or technology required for the task might be a way to increase organizational effectiveness.

It might be of interest to juxtapose this basic set of mechanisms against a simple listing of all the different methods that have been used to change individual or organizational effectiveness, at least to some degree. This list appears as Table 20 and is everything we could come up with, based on the current literature review plus others we have done.

Considering such a juxtaposition of underlying mechanisms against specific techniques poses some interesting questions about how various independent variables work. For example, does participation work because it influences choice and effort (motivation input) or because it leads to better utilization of information (a cognitive input)?

The moral here is that the more we understand about the processes involved the better off we are. However, researchers have not often looked inside the black box. There is a wealth of data concerning the correlations of these various independent variables with selected dependent variables but the processes involved are seldom examined systematically. Further, as was mentioned above, almost all these black box correlations have been computed using individuals, not organizations, as degrees of freedom. With regard to both individual and organizational functioning we think it would be well worthwhile for researchers to move toward more process type investigations.

TABLE 20
 PARTIAL LISTING OF POSSIBLE METHODS FOR
CHANGING THE EFFECTIVENESS OF ORGANIZATIONS

Personnel selection

Personnel classification

Career assessment and career planning

Individual training

- Orientation training
- Skills training
- Managerial and leadership training
- Human relations training
- Training to enhance the achievement need (nAch)

Individual counseling

Changes in promotional criteria

Incentive, or contingent, pay

Cafeteria pay plans

Scanlon plan

Behavior modification

Flexible scheduling

Job enlargement

Job enrichment

Participation in decision making

Organization development methods (behavioral science based)

- Survey-feedback
- Interview-feedback
- Problem solving meetings (temporary task forces)
- Laboratory training
- Confrontation
- Process observation and feedback
- Managerial grid
- Team development
- Intergroup laboratory

TABLE 20 (Cont.)

Management by objectives

Changes in organizational structure

Changes in functional arrangements (e.g., definitions of
task responsibilities)

Changes in managerial controls (e.g., human resources accounting)

Matrix management

Changes in organizational processes

Management information systems

Operations research and analysis

Communication practices

Manpower planning techniques

Advances in technology

IX: SOME CONCLUSIONS AND IMPLICATIONS

This has been a long and rather tedious trip through the literature pertaining to organizational effectiveness. It became considerably broader in scope than our original intent and it no doubt could be broader still. In general, we certainly did not expect to find any clearly delineated theories of organizational effectiveness or a well worked out system for operationalizing and measuring a well-defined set of facets that together made up the whole or organizational effectiveness. However, we were a bit unprepared for the lack of systematic thinking about the nature of the problem and the magnitude of the fragmentation concerning ways to measure organizational effectiveness. We did expect to find at least a few examples of innovative or provocative research that would clearly point to a useful direction that future research could take. There really were no such milestones. The criterion problem vis-a-vis organizational performance has simply not been given the same kind of systematic attention that it has with regard to individual performance.

What we hope we have done is both to reflect the state of the art as it exists and to impose at least the beginnings of a conceptual framework that can provide a means for thinking about the problem. If we have been successful then the reader should be able to place the theories and practices of MBO, OR, and OD types and the research of organizational sociologists and organizational psychologists in some sort of interpretive framework.

When we do this ourselves, we think it leads to a certain set of conclusions about the current nature and measurement of organizational effectiveness that can be used as a backdrop against which to suggest future research activities. Thus, we offer the following conclusions based on our review of the literature. A subsequent chapter will consider in more detail the direction that future research should take.

- A. The distinction between the goal-oriented and systems-oriented view of organizational effectiveness is a meaningful one and suggests very different behaviors on the part of the researcher or practitioner. However, we do not view them as necessarily conflicting points of view. They are complementary rather than conflicting and both can be used to advantage. For an organization to understand or seek to change its effectiveness it must be able to specify both the tasks it is trying to accomplish and the processes that are involved in accomplishing them. Both sets of questions can only be answered by the informed judgments of the relevant portions. Conceivably, the link between system or "state" variables and the degree to which important tasks or goals are achieved could be translated into a question. However, it is a very difficult one

to answer. Even the researchers at ISR have not been able to do so in any satisfactory fashion. They have the largest data base and the clearest model so far accumulated. Rather the dual questions of what tasks suborganizations should be trying to accomplish and what state variables reflect a "desirable" system can only be answered through the judicious use of informed judgment. Thus, a judgmental or scaling approach to the definition and assessment of organizational effectiveness should receive far more attention than it has. Such an approach would also help to reveal the crucial conflicts in values within an organization relative to how organizational effectiveness should be defined and measured, identifying and defining the nature of these value differences is perhaps where research or organizational effectiveness should really start. We will have more to say about this in the next chapter.

- B. Attempting to map out the empirical relationships among some set of independent, intervening, and dependent variables with the aim of achieving an overall understanding of how organizations work is probably a futile undertaking. Our present technology does not permit it. We simply cannot acquire the necessary degrees of freedom to investigate very many interactive relationships or even to pursue multivariate analyses of any complexity. It most likely is not possible to use empirical multivariate techniques to investigate the dimensionality of organizational effectiveness. Somehow the mess created by accepting the simple-minded fact that organizations are complex must be bypassed.
- C. Related to the above is our conclusion that since it probably is more difficult to find homogeneous sets of organizations than homogeneous sets of jobs, it may not be profitable to use a goal-oriented model to impose a similar "structure" of effectiveness across organizations. That is, even if it were possible, it may not be wise to factor analyze data on criterion components collected from a large number of organizations and thereby imply that the factor structure has a similar meaning for each organization. However, this conclusion may not be quite so applicable to organizations like the Navy where there are large numbers of homogeneous units.
- D. Generally speaking, the notion of overall organizational effectiveness cannot be given a substantive definition. It simply has too many parts that lose their meaning when they are added together. It is possible, of course, to ask observers to rank order organizations on one continuum without asking them to specify the nature of the continuum, but the degree of agreement will vary depending on the degree to which observers are focusing on the same facets in the same way, and if we don't examine those dynamics we haven't advanced our state of knowledge very far. One way of getting at

these dynamics would be to specify a specific set of tasks the organization must perform, and for each task the raters could rate the potential effectiveness of each organization, or they could rate the importance of a particular component of effectiveness for accomplishing the task. To the extent that the raters are knowledgeable and the tasks representative, a great deal could be learned about the joint function of individual effectiveness components under specified conditions.

- E. Within a particular "model" of organizational effectiveness, it might be profitable to think of the "components" of effectiveness even though empirical multivariate methods are not a feasible means for deriving the underlying structure of such components. It seems obvious from looking at the history of this problem that any serious taxonomic efforts must proceed within a relatively homogeneous value system.
- F. Since it is not possible to study organizational effectiveness intelligently unless certain questions pertaining to the organization's or investigator's values are settled first, it would be well worthwhile to focus a good deal of research on the value questions themselves. For example, is personal job satisfaction something to be valued for its own sake? Is high efficiency really a highly desirable end state?
- G. If the more important value questions can be settled, then we think it is possible to begin developing a taxonomy of dependent variables that reflect the "health" or viability of the organization. However, the measure of the variables in this list should not be developed from existing archival records. Such measures have never seemed to be very useful for anything. The instrumentation should be developed independently, with inputs from all affected parties, and should be imbedded in a consistent reward structure. That is, the reward system in the organization (formal and informal) should reward using the measurement system with as much fidelity as possible.
- H. Related to the above, we are persuaded that the organization development literature, including the Michigan-ISR work, in conjunction with the literature on the measurement of organizational climate provides a broad base from which to start building well-defined measures of an organization's state or health. We are not saying that such measures already exist. However, a good deal of the developmental work has been done and a number of blind alleys have been identified and they can be discarded. We can profitably build on this prior work.

- I. A disclaimer one often hears about whether a particular relationship between an independent and dependent variable will be observed is that it "depends on the situation," meaning that organizations are different and what might be true in one will not be true in another. As a response, a number of people have offered up taxonomies of organizations which supposedly outline the basic differences that must be taken into account. In terms of advancing our understanding of organizational effectiveness, this too has been a futile undertaking. Other kinds of intervening variable research are still in their infancy. For example, the empirical work on organizational structure reviewed in Chapter VII has not really gotten very far as yet.
- J. A neglected area of research has been the effects on the organization of significant changes in the kinds of people that are entering it. The entire domain of organizational effectiveness research and organizational change has a very environmentalistic point of view. This is an unfortunate state of affairs for organizations which are about to undergo massive changes in the way they recruit and select new members.
- K. The most fruitful research has not been that which tries to conceptualize sampling error and use the organization as a degree of freedom in the same way we do for individuals. Rather, an idealized picture of what appears to be more useful research would be something like the following.
 - . Drop back to individuals or work groups as degrees of freedom.
 - . Focus on dependent variables that you are willing to assume have an important link to overall organizational functioning.
 - . Include as part of the research program a systematic look at the process involved. That is, instead of demonstrating only that a program of job enrichment resulted in higher retention rates for skilled personnel, get inside the organization and try to find out precisely how the various elements of the job enrichment program affected the people involved. If the dynamics could be illuminated we should be in a much better position to predict whether a particular relationship will generalize. In general, we think it would be much more fruitful to identify the process parameters in a particular independent variable-dependent variable relationship and then see whether these are present in some other organization than it is to build a taxonomy of organizations and then decide if these organizational parameters have anything to do with whether a particular independent variable will work.

To sum up, we think we have identified certain directions suggested by previous research and theory that should not be followed. For example, empirical multivariate research based on a factor analytical approach to criterion development probably should be avoided. Developing taxonomies of organizations should be avoided. We also think we have identified some avenues that future research could profitably follow, and it is to an elaboration of these suggestions that we now turn.

X. FUTURE RESEARCH ON ORGANIZATIONAL EFFECTIVENESS IN THE NAVY

Research Content

The foregoing review of research on organizational effectiveness suggests that Naval research might usefully proceed in at least three broad but relatively independent substantive areas. Two relate to the discovery of or development of indicators of organizational effectiveness. They correspond essentially to the distinction we've made between the goal and systems models of organizational functioning. We've argued that these models speak to different aspects of the overall research problem and that they should not, therefore, be viewed as competitors. Each in its own right can be a useful basis for building a better understanding of effectiveness or for developing useful measures of organizational effectiveness. In essence, studies may be undertaken within each orientation that focus on the dependent variable side and will constitute frontal assaults on the criterion problem. The third general area receiving extensive emphasis from our literature review involves the means to be used in bringing about change in organizational effectiveness. That is, which handles should be pulled and how should they be pulled? Methods of Organizational Development (OD) have not been our main concern in this report, but research needs to be done in such areas, nonetheless. However, two preliminary points need to be kept in mind as we consider research related to the effects of various independent variables. First, most of the research proposed on the following pages is meant to be constituted of a multi-method approach relative to organizational effectiveness in Naval organizations. Different types of criterion analyses may demand and come to constitute, in themselves, substantial organizational development efforts. For example, a great deal of research on individual performance (e.g., Locke, 1968; Meyer, Kay & French, 1965) suggests that an understanding of the specific goals of an activity, frequent feedback concerning progress toward goals, and good communication between job incumbents and their superiors lead to better performance. Thus, the mere fact of learning about an organization's goals--certainly any large-scale programmatic effort in that direction--should impact on that organization's "OD efforts," as such knowledge is, in turn, used to develop techniques of systems control for use in monitoring regularly the "state of the system." All we really are trying to say here is that criterion development is organizational development, at least within this context. Our second preliminary point is that once measures of organizational effectiveness have been developed, or at least decided upon, carrying out field experiments designed to compare differences produced by manipulating various independent variables is at best difficult, and at worst, impossible. It may simply not be possible to mount full-scale experiments using organizational units as degrees of freedom, randomly dividing them into experimental and control groups, and conducting elegant experimentally precise analyses to derive generalizable conclusions.

Some persons might argue that a fourth substantive area is in great need of additional research, namely, the development of taxonomies of organizations and/or of organizational situations. Their rationale in favor of developing further taxonomies usually rests on the belief that the most important part of any answer to the question of how organizational effectiveness can be measured or how it should be changed is the phrase, "It depends . . . on what kind of organization you're talking about." Strictly speaking, such a response is fully legitimate and most certainly reflects an underlying desire for more ultimate explanatory concepts. However, it has been and continues to be our contention that our present technology is not yet ready to cope with the complexity that such taxonomic efforts may require. Thus, we bypass, for the time being at least, some of the difficulties created by inter-organizational differences, recognizing that they are indeed complex but offering no firm new or different suggestions for research on organizational taxonomies.

To summarize, the substance of our suggestions for research to be done in the years ahead focuses quite heavily on the analysis and development of criteria of organizational functioning whether they be systems or goal oriented. Only secondarily do we seek to outline systematic research studies on the independent "levers" that may or may not affect organizational functioning, though we urge the reader to note that any study of organizations can and usually does offer opportunities for observing, even though indirectly, their effects on the dependent variables of organizational functioning. Finally, we do not presume, at this time, to offer further taxonomic approaches to those already tried out, though we sincerely support any systematic effort the Navy might undertake in an effort to replicate studies that may have relevance for understanding more fully the functioning of Naval units and systems.

Research Strategies

In a bit of whimsy a few years ago, Dunnette (1970) suggested that the entire structure of scientific enterprise might be understood and described quite simply merely by referring to eleven verbs:

- Observe
- Record
- Compare
- Classify
- Count
- Speculate
- Vary
- Refute
- Persist
- Communicate
- Verify

These eleven action words offer a stepping off place for organizing our suggestions for research related to the substance and content of organizational effectiveness.

In setting out to study the Naval organization(s), a strong implication exists that persons are curious and that this curiosity will provide the impetus for observing and recording what is going on organizationally in the Navy. At a first (or lowest) level of abstraction, therefore, we outline several strategies for observing directly or for gathering and recording others' observations about Navy practices and outcomes. We believe such information may be rich in its yield of knowledge about the goals, processes, and independent variables of organizing the Naval organization.

At a second level of abstraction, with records and systematic accounts of variables and potential variables available, the scientific study of the Naval organization will seek to establish some parsimony through comparing, classifying, counting, and interrelating the variables under study. Statistical and psychometric (including multivariate) investigations are suggested which seem to flow readily from the observations and records of earlier investigations.

As psychometric results become available, the scientist's curiosity is likely to be whetted anew. But, as we have suggested, he may be in for a tough time if he hopes to continue his studies in field instead of controlled laboratory settings. Thus, at a third (or highest) level of abstraction, his curiosity will often lead him to speculate about the underlying regularities he has detected and how they come about. He seeks to develop explanatory models or theories about the likelihood of various causal sequences or nomologic relationships among his variables. From psychometrics, therefore, the possibility of certain experimental and quasi-experimental investigations - in both field and laboratory - are suggested for the possible future investigation of Naval organizational effectiveness cause and effect relationships in the years ahead.

The remaining three verbs listed by Dunnette - persist, communicate, verify - speak more to the needs for rigor, community of scientific interaction, and replication of investigations than to the actual procedures of research investigation. Thus, in our research suggestions, we simply assume the existence of these "scientific" values as givens and shall offer no further reflections upon them. However, each of the other levels of investigation deserves some brief further comment before we plunge into specific research suggestions.

Naturalistic Observation

Observations and records of what is happening within an organizational context take many forms. At one extreme, lay (non-scientific) observations can easily be made and reported by sailors who live and work within the Naval organization. But their reports are likely to be casual, unsystematic, incidental, and incomplete. In contrast, a scientific observer may also live in the Naval organization. His observations and records will be more systematic; they will either

be exhaustive (recording each detail) or representatively sampled; they will be purposive instead of incidental or casual. But scientists will differ one from another in the extent to which they make themselves known as "outsiders" (obtrusive vs. unobtrusive), in the nature of records kept (film, diary accounts, structured categorizations for recording events, etc., etc.), and the degree to which they simply describe what is going on vs. seeking to interpret their observations in the context of prior expectations or hypotheses. The foregoing forms of observation are examples of observations made in vivo (i.e., observing and recording take place at the same point in time as the time when the behavior itself is unfolding).

A different form of observation is that which may best be termed retrospective. Again, at the one extreme, retrospective reports may take the form of an unsystematic and basically unstructured verbal account of something that has taken place at some time in the past. Increasingly systematic approaches may include such techniques as observers filling in rating forms or check lists responding to questions from trained interviewers using either no structure, loosely structured, or highly structured questionnaires (such as public opinion and attitude surveys), or responding to rather focused questions but in an essentially anecdotal or story telling manner. The latter approach essentially is the method employed in critical incidents methodology which, as we shall see shortly, seems to offer a number of promising possibilities for research on organizational effectiveness. Though memory may act to distort observations and reports, methods of retrospective observation have one highly important advantage. Instead of offering information about just a rather short time span (as is almost always the case for in vivo observation), retrospective accounts can be called forth from a very wide range of prior experiences and over much more extensive spans of time.

Psychometric-Multivariate Methodology

Obviously no need exists for the readers of this monograph to be indulged by a course in statistics, correlational methodology, or factor analysis. For our purposes, it is important only to note that multivariate methodology, in its purest form, is usually an effort to examine a number of variables by measuring their co-variation in the real world. Now, the definitions of what constitutes the so-called real world may differ. In some rare instances (as in the Seashore insurance agency study described previously), measures may be taken of a number of variables in vivo (i.e., while the people and the organizations are really behaving in their day-to-day ways). More commonly, perhaps, the "real world" is constituted of a series of measures (usually paper and pencil) taken on persons as they describe their perceptions of what goes on back in their real worlds. The most crucial point of the Psychometric-multivariate-differential approach, probably, is that a great effort is made to tap as many of the variables of interest as possible, allowing each hopefully to range over its entire "real world" range, as opposed to restricting the numbers of variables to be studied or the ranges over which they are

measured. As such, psychometric studies may frequently be merely parametric, normative, descriptive, or, at best, taxonomic. Rarely, are they based initially on deductions derived from strong theories or models (though they may be), and rarely do causal statements flow correctly from their outcomes.

Experimental and Quasi-experimental Methodology

A more certain methodology for deriving causal conclusions is experimental methodology. Experimental designs differ, first, in their degree of replicability. The well known experimental group-control group design, when "staged" in a laboratory setting and when fully described is fully replicable. In contrast, an equally tightly designed experiment even with random assignment of persons to control and experimental group situations, if conducted in a real operational setting will often not be fully replicable, particularly when used to "evaluate" one or more intervention techniques (such as a new training, counseling, or survey feedback program) that will not likely be repeated in unmodified form at any future date. Finally, a respectable but far from replicable approach, depending heavily on the special observational, creative, and reporting powers of a particular experimenter, is the clinical-experimental approach. In our opinion, a classic example of clinical-experimental methodology is the development by Piaget of his theory of cognitive human development. In a similar sense, Freud might be termed a theoretician who depended heavily upon clinical-experimental evidence for the full development of his theories of human personality. At the level of program evaluation in areas related to organizational effectiveness, the clinical-experimental approach carries different labels, verging more closely, perhaps, on various modes of observation similar to those already commented upon previously. Useful reviews of the merits and demerits of clinical procedures applied experimentally to program evaluations are provided by Becker (1958) and by Glaser and Backer (1972; 1973). The crucial point, of course, is that causal inferences derived from such procedures depend heavily upon the special clinical talents and observational accuracy of the experimental clinician who is reporting the account of his procedures and results. Others, operating within the same clinical case setting, will, at best, encounter difficulties repeating the clinical-experimental procedures reported by that experimental clinician; or, at worst, derive quite different causal inferences from the results obtained. Though perhaps not widely regarded as such, the Hawthorne studies, particularly the various interpretations of results derived from them, are probably best classified as a series of clinical experimental investigations.

Again, no need exists for readers of this monograph to be offered a treatise on experimental and quasi-experimental designs. But mention should be made of a few key statements made by outstanding methodologists, for those readers who wish to examine the relative efficacy of such approaches in some greater depth. These include statements by Campbell and Stanley (1966), Campbell (1969), Bond (1973), Salasin and Campbell (1973), and Cook and Campbell (in press).

A second and somewhat more obvious way in which experiments differ from each other is their locus, and this relates, in turn, to the degree of realism experienced by the persons who are serving as subjects in the experiment. The usual location, of course, for the conduct of experiments has been a laboratory setting. Realism suffers in many ways ranging from the subjects (college students vs. workers), the variables dealt with, the range over which the variables are examined; and, most particularly, the demand characteristics of the experimental vs. real world setting. In contrast, experiments conducted in real world settings must often sacrifice such things as control of variables (both their number and measurement) and random assignment of subjects in favor of greater realism. Even in real settings, however, it is rare indeed for the "subjects" to be unaware of the fact of experimentation; thus demand characteristics and the pervasive "Hawthorne Effect" may affect the results obtained and their interpretation. Campbell (Salasin and Campbell, 1973) argues strongly, however, for the very great feasibility of carrying out unobtrusive, fully experimental evaluations of programs that are in short supply, and this argument seems to us to apply with special force to the possibility of studying the independent variables of organizational effectiveness in the Navy. In short, when a program (say, for example, a survey feedback technique) is to be implemented, there is no need to introduce it across the board. Instead, Naval units might be divided randomly (within certain meaningful strata) and the program introduced to only the experimental sub-set, dependent measures audited across both sets of units are preliminary conclusions drawn by contrasting the measures. Moreover, additional useful information would then be obtained from a time series analysis (See Bond, 1973) of the dependent measures as the program is then introduced into the sub-set of units initially used for "control" group purposes.

In fact, Campbell is very much in favor of pushing strongly for the use of full experimental designs and seeking to avoid the loss in clarity of inference resulting from quasi-experimental designs, though he does still regard the "regression-discontinuity design" and the "interrupted time series with comparison series" as being among the most powerful quasi-designs - clearly superior to most of the other quasi-designs.

To summarize, strategies for research on and about organizational effectiveness in the Navy have been discussed according to methods of Naturalistic Observation (in vivo and retrospective), Psychometric-Multivariate-Differential, and Experimental and Quasi-Experimental. The experimental methodologies, we should remember, almost always imply some theory or model that is to be evaluated or tested. Simply planning to introduce a new organizational program in the Navy must be derived, usually explicitly and most certainly implicitly, some model or theory that relates the parameters of that program to expected organizational outcomes (goals) or processes. Thus experimentation is the methodology of choice if these assumptions flowing from such models or theories are to be evaluated in any causal sense. It is sad, therefore, that experimentation in the field is (or, at least, has been assumed to be) so difficult. But through suggesting a few possible approaches involving field

and laboratory studies using both experimental and quasi-experimental designs, we hope to provide Navy behavioral science researchers with at least some food for thought.

Research Project Suggestions

We offer here a series of approaches to be considered for studying the construct of organizational effectiveness in the Navy. We see this listing of different studies, at this stage, as being closer to a grocery list than to a road map. We are not sure of the best sequence for undertaking these studies and, therefore, we do not offer them within an additive framework, though we would hope that programmatic planning of organizational research in the Navy may profitably begin with these suggestions as starting points, organize them meaningfully, and derive a systemic approach for carrying them out. As is apparent, our "grocery list" is coarsely clustered within the research strategies we have just discussed. If any sequence at all is suggested by our review of the literature and by our thinking about it, it would be one which moves in some planned way from the lower levels of abstraction involving observation, enumeration, and the investigation of the psychometric properties of variables to the higher levels of abstraction involving the investigation of linkages and causal interactions between independent and dependent variables. A critically important way-station connecting research studies at these different levels of abstraction must, of necessity, be a Naval model of organizational effectiveness. We suggest, therefore, that early research activities be undertaken with a view toward elaborating such a model and that its form and content should be used as a basis for designing later research activities to test it, disconfirm aspects of it, modify it; and, ultimately to develop in a formal way a fully elaborated theory of organizational effectiveness in the Navy.

1. The need for a Naval model of effectiveness. As mentioned immediately above and as suggested at various other points throughout this monograph, research directions in the area of organizational effectiveness are destined to be diffuse, scattered, and poorly focused until a model of effectiveness is available to provide the required focusing efforts. Naturally, we abhor the thought of merely slapping a model together or just "pulling one off the shelf"; premature model building or theorizing can and has (as we have seen) led researchers down a number of blind alleys. Nonetheless, we believe strongly that the Navy's first order of business should be to use all rational and empirical means at its disposal in an attempt to develop and articulate in some detail the nature of the effectiveness model it wants to use. We realize that there already exist a certain amount of folklore on the one hand and formal written mission statements on the other that speak to what an effective Navy should be like. However, we think the development of a "Naval Model" should go beyond these points in several respects. To wit:

- i. The Naval Model should deal with the question of whether it wants to be goal oriented or systems oriented. We

believe that the most useful model must incorporate both orientations.

- ii. On the systems side the model should seek to identify and define reasonably completely the "state" variables that are regarded as important, and if possible, their relative importance. For example, should something akin to degree of job satisfaction or job "alienation" be included? After decisions about the nature of "state" variables to be included have been made, their meanings must be specified and, most importantly, indicators decided upon or developed to measure them. Obviously, such developments are dependent upon research data, and a number of the studies suggested on subsequent pages bear on this issue. However, even before such data become available, we think that a good deal of a priori head knocking could go on in the form of problem solving conferences convened to consider just these issues.
- iii. On the goal side, the model must deal with the question of whether or not it is possible to describe in some detail the goals that Naval organizations should be trying to accomplish. For reasons argued in previous chapters, we do not think it is possible to develop a general goal statement in such a way that the same statement could be applied to the development of criterion measures in all subunits of the total Naval organization. For example, the Navy could decide, in general terms, on the degree to which it wants (or does not want) to serve as an "employer of last resort" for the nation's labor force. However, the ways in which individual subunits might contribute such an overall goal would be different. Their goal statements must be integrated with the overall goal, but the content of the specific subunit goals will differ.

Also on the goal side of the Navy Model we think it would be more useful if the model specified methods that should be used to develop goals for specific subunits and the methods that should be used to integrate the specific unit goals with overall Navy goals. In a sense, we are opting for some variant of the MBO approach as a methodological component of the Naval Model as it is expressed in policies and practices. Obviously, activities of this sort are already being implemented to varying degrees in different parts of the Navy. We believe it will be fruitful to consider carefully how such methods may be incorporated more uniformly.

- iv. Initial efforts to formulate the model should be as specific as possible about the methods that should be used to assess the systems or state characteristics and the methods that should be used to determine the goals for a particular unit for a particular time period. That is, they must be given a certain amount of operational meaning to prevent misunderstandings as to what is actually being advocated. For example, turnover, job satisfaction, etc., can have different meanings depending on how they are measured. Only if the Naval Model seeks to be fairly specific along these lines will it be able both to tease out the disagreements people in the organization have and to provide clear guidance as to what's meant by effectiveness.

Three primary functions of a Naval Model of effectiveness will, therefore, be to:

Guide additional research on the development of effectiveness measures.

Provide guidance for the kinds of organizational development and change programs that should offer the best payoffs.

Serve to focus future discussion amongst relevant decision makers as to what an effective Navy should be like.

Thus while new research data would be used to modify and refine the Model, it is perhaps just as important to use whatever informal opinion is available at the outset to articulate a working model as clearly as possible. What we are advocating here is a certain amount of effort to be devoted at the beginning of any research program to the development and articulation of an admittedly incomplete but useful working model to guide even the earlier research efforts.

2. Naturalistic Observation studies. We begin our grocery list of possible research activities with a sampling of studies involving the naturalistic observation, both in vivo and retrospective, both incumbent and scientist-observer, of Naval organizational units.

a. On site. Systematic records need to be made of what goes on within organizations. On site observations and records of managerial behavior have been made by Carlson (1951), Burns (1957), Dubin & Spray (1964), Horne and Lupton (1965), and Stewart (1967). An extensive

technology has also been developed and perfected by Professor Sykes and his colleagues for recording the elements involved in police-citizen encounters. We are not presently aware of similar recording methodologies which focus on the behavior patterns of entire organizations or of subunits of organizations. We suggest, however, that systematic observations are needed and that they are a first step toward defining both the goals and the processes of Naval organizational units.

i. Objectives. Such studies would have the following objectives.

- . development of descriptive protocols of Naval organizations in process;
- . development of a coding methodology for recording organizational "episodes" and their descriptions;
- . development of first steps toward identifying key processes linking organizational units and individuals; and
- . development of inferences about the goals and outcomes most likely to be common to specific units and/or general across many organizational units.

ii. Procedure. Procedures which might be used in such research include the following:

- . Knowledgeable enlisted men and officers serving in various types of organizational units could be asked to keep rather detailed "organizational anecdote files". In essence, they would be asked to record detailed accounts of unit behaviors which they perceived to be either good or bad. At first, the definition of "goodness" would need to be left up to each of the incumbent observer-recorder, the only constraint being that he describe things that had happened that involved a total unit activity rather than merely individual behaviors and actions.
- . Analysis of protocols such as those obtained above would aid greatly toward defining more fully the nature of high frequency and high importance organizational occurrences within the Navy. Behavioral scientists could then begin "living in" different organizational settings to observe and record similar protocols.

- . As more information is obtained using the quasi-systematic procedures outlined above, inferences may be drawn, tentatively at first, but more definitely as more data are accumulated about the varieties of goals implicit in the behaviors of various units and the processes by which various organizational units and actors may be linked to achieve such goals.
 - . Inferences about goals and processes could then be formulated more explicitly in the form of coding methodology to standardize the recording of organizational episodes, and these methodologies could be applied both by additional Naval expert observers (enlisted men and officers) in different settings and by behavioral scientists working in those same settings.
- iii. Implications. Admittedly, these suggestions for making on site observations of "organizational episodes" hardly look like research. We cannot emphasize too strongly, however, how sadly lacking the literature of organizational effectiveness is in terms of just this sort of observational material. Most great steps forward in science have only been possible because some "toiler in the vineyard" first provided the raw material on which to base the crude beginnings of an organized measurement and experimenting system. In essence, we are suggesting that these observations may be one first step toward developing such "raw stuff" of organizational effectiveness in the Navy. Related, but somewhat more abstracted approaches to the development of such materials are suggested in additional studies below.
- b. Training in the self-analysis of goals. As should be abundantly clear by now, we are persuaded that the process of goal identification and goal specification is an extremely important activity, both cognitively and motivationally, for organizations. Such goal specification has implications for both the dependent and the independent variable sides of the effectiveness equation. Within a goal oriented model of organizational effectiveness, the only way to develop criterion measures of effectiveness is to first determine the goals which the organization is pursuing. In addition, the very act of goal identification provides guidance for the organization as to how it should be structuring its efforts. Thus the process of goal identification and specification might also be an independent variable, or a "handle" with which organizational effectiveness can be changed.

- i. Objectives. The overall objectives of this sort of approach would be:
 - . develop alternative procedures for Naval organizations to use to analyze their own goals;
 - . train samples of officers in each of the procedures;
 - . compare the usefulness of each procedure "in the field".

- ii. Procedure. Basic assumptions on which this type of study would be based are that goal analysis is a relatively continuous process and that the people in the organization, not some outside consultant, should possess the means for making the analysis. The people in the organization should recognize the importance of such analysis, they should view it as a part of their responsibility, and they should have a variety of skills available for performing this function. There are at least three different procedures that officers could use to conduct a goal analysis:
 - . They could ask different groups in their organizations to provide samples of critical incidents of what they considered to be effective and ineffective performance on the part of the organization. The goals perceived by each group could then be inferred from the sample of incidents. This would necessitate that the officers be trained in critical incident methodology. The training content would also have to include an explanation of the rationale for using this procedure (e.g., the notion of inferring goals from behavior when people are unable to articulate what they want to do), training in explaining it to others, and some actual practice in its use.
 - . A second approach is to ask officers to hold a series of group meetings with their subordinates in order to articulate goals directly. We think this would require considerably more skill on the part of the officer and administrator and may present a more difficult training task. All the attendant problems of group leadership and group problem solving come into play. However, in the end it may be that such a procedure would be the most "satisfying" to the participants and would be the one which would lead to most goal agreement.

- . A third alternative would be to teach officers and their staffs to become participant observers and actually collect observations of the behavior of the organization's decision makers. Procedures such as the ones suggested could be tried out among groups of officers in terms of:

the ease with which they can be taught to use it;

the ease with which they can use the technique with their subordinates;

the degree to which the officer feels it is an effective tool for him to use; and,

satisfaction of the subordinates with the procedure.

- iii. Implications. We have argued in previous chapters that to use goals as a basis for determining performance criteria or for guiding the activities of an organization, there must exist some means for determining the specific goals of a specific organizational subunit. That is, general goal statements composed at some high level in the organization will not prove useful at lower levels. Thus individuals at those lower levels must have some available means for analyzing the goals of their own unit. If effective methods for conducting such an analysis were worked out it would make the guidance and evaluation function of goal setting much easier.

c. Development of dimensions of organizational effectiveness through critical incidents methodology. It's no secret that individuals in organizations often have difficulty articulating both the general and specific goals of the organization as well as the underlying dimensionality of effectiveness within or across organizations. Discussions of goals which begin on the general end and try to work toward the specifics usually get nowhere. In contrast, the critical incident approach is designed to begin by sampling specifics and to work backwards toward the more general and the more homogeneous.

Such an approach makes very reasonable assumptions. First, goals are being pursued even if they can't be articulated clearly. Second, goals and aspects of organizational effectiveness are manifested in behavior of individuals, groups, or organizations. Third, persons who have been working in Naval organizations can think back over a rich array of experiences and describe specific instances of when organizations they've been a part of have "behaved" in effective and/or ineffective ways. Recently, these assumptions and the methodology for

developing dimensions were tested operationally by using the critical incidents methodology to discover and develop measuring scales for evaluating organizational morale of Army units. The dimensions discovered in this way are listed below (each was, of course, defined and anchored firmly with the behavioral descriptions making it up):

- . Pride in Country, Army and Unit
 - . Superior-Subordinate Relations
 - . Performance and Effort
 - . Community Relations
 - . Reactions to Adversity
 - . Teamwork and Cooperation
 - . Discipline and Military Appearance
- i. Objectives. The aims and objectives of this study would be as follows:
- . to identify the operating goals in a variety of Naval units;
 - . to identify similarities and differences in operating goals for different groups of personnel within the same organizational unit; and
 - . to develop a manageable set of criterion measures for assessing goal achievement and/or organizational unit effectiveness over a wide variety of organizational units.
- ii. Procedure. The procedure proposed here is intended to represent a series of studies, of the same type, to be conducted in many different organizational units. At a minimum, it would be desirable to sample at least two units each from at least six different types of organizational units.
- . For each unit under consideration, at least three pairs of groups of observers should be chosen. For example, on a ship, the groups could be composed of enlisted men, junior officers, and senior officers. Each group should contain from 10-20 people. Each

group would meet in a small group workshop format. After some discussion of the breadth of the organizational effectiveness construct and the difficulties involved in measuring it, the critical incident methodology would be explained in some detail. Each participant would then be asked to write a description of at least 5 events that to him represented effective organizational performance and at least 5 events that represented ineffective organizational performance.

- . The incidents contributed by each group would then be content analyzed and clustered by a 3 or 4 man panel of research personnel and operating personnel. The result would be a tentative cluster analysis of the critical incidents which would constitute a "first cut" at defining factors of effectiveness as a specific group sees it.
- . The third step would be to meet again with the groups to consider results of the tentative cluster analysis. The purpose of the ensuing discussion would be to consider (a) whether or not the tentative clusters make organizational sense; (b) whether or not important factors have been left out; and, (c) whether or not any of the tentative clusters overlap to such a great degree as to be conceptually indistinct. To the extent that factors which the groups feel are important remain under-represented by critical incidents, the group will be asked to write more to fill in the gaps.
- . The fourth step would be to carry out the retranslation step as described in Smith and Kendall (1963) and Dunnette (1966). Since a pair of groups was originally selected from each organizational level, each group would retranslate the incidents written by the other. Besides matching incidents to dimensions, the judges should also be asked to scale the importance of each incident for defining the dimension. In essence, this is asking the judge to produce a "factor loading" for each incident. At the conclusion of this step in the procedure there would be data available as to (a) how reliably incidents could be classified into dimensions; (b) how closely each incident represents the core of the factor; and, (c) the degree to which judges agree on the scaled factor loading.

iii. Implications. The major advantage of such a retrospective approach has already been specified. The approach draws on the vast observational experience represented by Naval personnel over their entire Naval careers. As such, the likelihood of more fully exhausting the total domain of facets of organizational effectiveness is much greater than the series of in vivo observations proposed in 2a above. Thus, the procedures spelled out here would provide a great deal of information about the operative goals of Naval units and the degree of agreement about those goals among different organizational members. Currently, such data are presumed through conjecture only. With information suggested here, Naval management could consider whether the goals upon which individual units are operating are consistent with overall Naval policy and whether discrepancies that appear have positive or negative utility. Data produced by such study should also provide considerable guidance for how to construct criterion measures of goal achievement and Naval Organizational Effectiveness.

3. Psychometric-multivariate-differential studies. The second cluster of items on our grocery list of studies involves the psychometric evaluation of both existing measures and measures which may be derivable from the studies described above.

a. Investigation of organization "health" via multi-construct, multi-method analyses. Measuring the "state of the system" is viewed by many researchers and practitioners as an important part of any attempt to determine organizational effectiveness. As evidenced by the current review, the enterprise we labeled as organizational development (OD) has made a number of suggestions about what state variables describe healthy or effective organizations, but agreement about the best measures of them is far from complete. Researchers interested in "organizational climate" have developed a plethora of measures but have in turn made few value judgments and offered little theory as to what "scores" constitute a state of organizational effectiveness. The Likert-ISR model is perhaps the only systematic research effort that has tried to do both. However, the Survey of Organizations can be faulted on the grounds that it does not possess a great deal of discriminate validity.

It is also relevant to note that none of the questionnaire measures of organizational state characteristics were constructed using Navy data, and their "carry-over" to the Navy may be questioned.

We should also note that if a decision is made that the "state of the system" should be monitored regularly, and we think such a decision

would be sound, the Navy would have to have in its possession, measures of system variables that exhibited considerable construct validity. One such monitoring system does exist in the private sector (Smith, 1973); the Sears organization has come to accept the construct validity of the questionnaire measure and is more than willing to take decisive action on the basis of the data they produce.

Generating construct validity for questionnaire measures of organizational system characteristics is not an easy task, and Guion (1973) has agreed that, with regard to measures of organizational climate, it has not yet been done to a satisfactory degree.

This difficulty is magnified by the general lack of clear conceptualization or what constructs are actually under investigation. That is, even on a conceptual level there is very little convergent and discriminate validity. For example, what are the conceptual relationships among job satisfaction factors, organizational climate factors, and job alienation factors? No one has yet offered any very straightforward conceptual statement.

Nonetheless, there is reason to be optimistic that the plethora of instruments and indicators can, with the methodology suggested below, be reduced to fewer, more statistically sound and conceptually meaningful constructs. In fact, preliminary results of using many different "indicator" instruments in one very large organization suggests that discriminate validity across methods of measuring different types of individual responses to organizational circumstances can be "teased out". Below, for example, is the multi-construct-multi-method matrix showing results with a number of self report measures of motivation, morale, and different facets of satisfaction.

Multiconstruct - Multimethod Matrix

	Mot.	Gen. Sat.	Job Sat.	Sat. Sup.	Sat. Cowork.	Sat. Pay
1. Motivation (4 methods)	45					
2. Overall Satisfaction (4 methods)	37	64				
3. Satisfaction with the Job (5 methods)	40	53	66			
4. Satisfaction with Superiors (3 methods)	29	41	37	58		
5. Satisfaction with Co-workers (3 methods)	19	26	27	34	44	
6. Satisfaction with Pay (4 methods)	15	41	30	22	16	44

The indices in the diagonals of the matrix are mean within construct correlations and the off-diagonal indices are mean correlations between scales or items representing different constructs.

- i. Objectives. It is the aim of this particular study then, to sift through the available measures of systematic variables, weed out the obvious overlap, fill in the gaps where the available measures do not cover variables suggested as being important by various models, and submit the total item pool to extensive convergent and discriminant analysis on Navy samples. The first product would be a comprehensive instrument that would represent the "purest" and the most complete factor structure that it is possible to achieve for Naval organizations. The measures for each factor should possess high reliability and substantial construct validity. The instrument should be applicable (perhaps in modular form) to a wide variety of organizational subunits, it should be perceived as legitimate by the users, and it should be economically feasible to administer it on regular occasions.
- ii. Procedure. We should preface our remarks by assuming that there is at least some agreement within the Navy that the Naval Model of effectiveness should include indicators of one or more "state" characteristics. If this assumption is reasonable, then we believe the following procedure would be appropriate:
 - . The first step would be to assemble all the available measures that might be potentially useful and consider their similarities and differences, item by item. The material reviewed in Chapter V suggests that the following questionnaire measures of organization climate should be considered.

Group Dimensions Descriptive Questionnaire (Hemphill & Westie)

Survey of Organizations (Taylor & Bowers)

Agency Climate Questionnaire (Schneider & Bartlett)

Business Organizational Climate Index (Payne & Pheysey)

Litwin and Stringer Climate Questionnaire

House and Rizzo Questionnaire

Campbell and Beaty Questionnaire

In addition to the climate measures, measures of job satisfaction and individual need fulfillment and work alienation should be considered. The most relevant would be:

Minnesota Satisfaction Questionnaire

Cornell Job Description Index

Brayfield Rothe Job Satisfaction Scale

Other potential candidates that are already operationalized:

Porter and Smith's measure of Commitment

The Guion and Landy "motivation" questionnaire

The Lodahl measure of job involvement

A special category to be considered, perhaps just because of the publicity it has received, are perceptual measures of job alienation, or the "quality of working life" (Shepard & Herrick, 1972; Work in America, 1972; Senate Hearings on Worker Alienation, 1972; Seeman, 1959, 1971). There are a number of different definitions of work alienation and a number of different operationalizations of the construct, and the two do not always match well. For example, even though the definition sounds different, the items used to measure alienation are often indistinguishable from those used to measure job satisfaction as industrial psychologists have typically thought of it. However, to insure that no important perceptual factors are missed, we suggest that the following measures of "alienation" also be included in the item pool.

The Pearlin alienation from work scale (Pearlin, 1962)

Powerlessness at work (Shepard, 1972)

Self estrangement from work (Kirsch & Lengermann, 1972)

Work alienation index (Seeman, 1967)

Shepard and Herrick alienation index (Shepard & Herrick, 1972)

The next step would be to consider carefully the array of potential indicators of system effectiveness that are

portrayed in Table 1 in Chapter III and in Table 4 in Chapter IV. Many of these are already being tapped by the available measures, but some are not. For example, no operationalized measures exist for things like role and norm congruence and the degree to which there is specific goal consensus among relevant organizational measures. For unoperationalized variables which are nevertheless thought to be potentially important, new items will have to be written.

- . By careful sifting it should be possible to reduce the total bulk of measures to a pool of 250-300 items. These items must then be administered to samples of Naval personnel in a wide variety of units and from several organizational levels. It would be beneficial to think in terms of a total sample of 5,000 or more. The sample would have to be split into a developmental group and two hold out or cross validation groups.

The data from the developmental group would be used for the following operations.

- 1) Homogeneous factors or clusters of the items within each format would be tentatively identified via empirical clusters or factor analysis.
- 2) Items with no significant factor loadings and items exhibiting no variance (either across units or across people -- whatever is appropriate) would be discarded. For example, organizational climate items yielding no between unit variance should be discarded.

iii. Implications. The usefulness of this study for further analytical procedures related to Naval organizational effectiveness is great. The major outcome is a yield of a few, relatively short, but "pure" construct measures of organizational attributes. As such, the measures could then be available for use in conducting a continuing "audit" of the state characteristics of Naval units and subunits as they may vary over time.

b. An application of multi-dimensional scaling. With regard to criterion development, previous research suggests that (a) using organizations as degrees of freedom, (b) measuring each organization on a large number of component criterion variables, and (c) factor analyzing the covariation among the components is not a particularly fruitful way

to proceed, particularly if there are not a large number of homogeneous organizations on which to collect data and there is no clear model to specify the criterion components that might be important. However, it is also true that decision makers frequently make judgments as to whether one organization or organizational unit is "better" than another. It should be possible to work backward from such global judgments in an attempt to uncover the ingredients that go into the global judgment. Two kinds of such ingredients are the tasks or objectives the decision makers think an organization should be pursuing and the organizational characteristics (i.e., our "state" variables) which he thinks lead to the accomplishment of the goals.

i. Objectives. The objectives of this series of studies would be:

- . To use multi dimensional scaling methodology to "recover" the factors which relevant sets of decision makers use to judge whether or not an organizational unit under their jurisdiction is "effective".
- . To determine how the content of the factors Naval decision makers take into account might differ as a function of the organizational position of the decision maker and the overall "set" or objectives under which he is trying to decide upon a rank ordering of units in terms of their effectiveness.

ii. Procedure.

- . Several relevant groups of decision makers should first be identified. It would be best if there were at least 15 judges in each group (e.g., the top echelons of a headquarter's staff or the senior command of a ship) and that each judge in a particular group have some familiarity with a large sample of organizational units. It would be best if each judge actually had important decision making responsibilities with regard to the organizational units under consideration.
- . Each decision maker in a particular group would then be asked to judge the relative overall "effectiveness" of the organizational units in the sample. Depending on the scaling model to be imposed (cf Shepard, Romney & Nerlove, 1972) the task usually will take one of two forms. Either a paired comparisons procedure can be used and the judge simply indicates which of each pair he thinks is more effective, or the judge uses a numerical scale to rate the relative "similarity" of each pair of organizational units in terms of their overall effectiveness.

- . A multi dimensional scaling model can then be applied to this set of judgments to determine the number of "factors" required to explain the pattern of judgments. If effectiveness is indeed unidimensional, only one factor will be recovered. If it isn't and there are two or more relatively distinct facets of effectiveness that contribute to the judgments then the organizational units in the sample will be differentially arrayed on the factors.
 - . As pointed out in Chapter IV, defining the factors then becomes an ad hoc procedure in which systematic questioning of the original judges or other means are used in an attempt to distinguish the characteristics of the organizational units that define each factor. Strictly speaking, these characteristics should then be cross validated to see if they can again identify the units defining each factor in a second set of judgments.
 - . The above procedure should be repeated with the judges under varying instructional sets. Four possibilities are: (1) peacetime-full employment economy, (2) limited war, (3) full scale war, (4) Naval budget about to be cut 10%. The most useful instructional sets to use in this series of studies should be a function of opinions of the most relevant Naval experts. That is, given the fact we can ask each judge for three judgments, which 3 sets of instructions would provide the most information, in the opinion of knowledgeable Navy personnel.
- iii. Implications. A study such as this would be one indirect method (but not the only method) for determining the factors which comprise real decision makers' definitions of the organizational effectiveness of Naval units when realistic type decisions are called for. If the study were repeated for different sets of decision makers and different task situations, we would begin to get a much clearer picture of the multi dimensionality of organizational effectiveness in specific situations.

A study similar to the one described here is currently under way. Its basic elements and some of the early results obtained are described briefly below in order to give the reader a flavor of how one may begin with judgments of experts and move to quantitative indicators of unit status.

c. Development of an index of organizational status. Borman and Dunnette (1974) describe the application of quantifying methods to judgments derived from 23 Naval officers as a first step toward identifying and weighting key components to comprise a Naval Personnel Status Index. A description of their methodology is given here simply to provide a paradigm that should be applicable to the development of more comprehensive measures of organizational effectiveness or status.

i. Objectives.

- . to develop a status index with the following properties:

capable of being expressed as a single number but retaining the identity of its significant component indicators for possible diagnostic purposes;

interpretable in an evaluative sense;

made up of components with sufficient ease of accessibility to insure a high degree of timeliness;

useful as a means of "evaluating" the relative impact of changes in personnel practices and policies or of behavioral research interventions; and,

be credible and reasonably free from danger of loss of credibility through gun decking.

- ii. Procedure. The first step in selecting components for an NPSI is to generate a list of potentially useful component measures. To accomplish this, a two-day workshop was designed to generate such a list. Approximately 23 Naval officers attending the Navy Postgraduate School in Monterey, California participated in the workshop sessions. In addition, a small group of instructors at the Postgraduate School attended some or all of the sessions. The workshop group contained officers with shipboard experience in small patrol vessels, destroyers, cruisers, and carriers.

The group's experience level was high in terms of knowledge about a wide variety of potential NPSI component measures. Most officers were quite familiar with such data systems as NEC and 3M. Also, most participants were knowledgeable about the configuration of a variety of Bureau of Naval Personnel data potentially valuable for an NPSI composite. Finally, all officers knew a considerable amount about data routinely kept aboard individual ships; and, they had a good feel for possible ways to combine existing data to yield useful component measures.

Participants were divided into two subgroups to generate ideas for potential component measures. Officers in one of the subgroups were encouraged to recall ships they had been assigned to or were familiar with and then to think about the status of that ship's personnel subsystem. Then, these officers were

asked to record the cues, information, or factors which led them to assess the personnel status of that ship the way they did. This method resulted in the generation of 20-30 components potentially applicable to NPSI measurement. The leader of the other subgroup requested that his officers generate potential NPSI component measures directly. Thus, officers in this subgroup introduced component measure ideas directly to others in the subgroup. Then, each suggestion was discussed and eventually accepted, rejected, or refined by other group members. This procedure also resulted in 20-30 ideas for NPSI components.

The two leaders then pooled the ideas they had received from their groups. There was considerable overlap between the two groups' output in terms of the kinds of components suggested and even the actual measures proposed for each component. The pooling operation yielded the 29 measures or areas shown below.

- | | | |
|-----|----------------|--|
| 1. | (REENLIST) | Reenlistment rate |
| 2. | (MAST) | Non-judicial punishment rate |
| 3. | (R/NR) | Ratio of rated to non-rated personnel |
| 4. | (Q/NQ) | Ratio of qualified to non-qualified personnel |
| 5. | (UAR) | Unauthorized absence rate |
| 6. | (REENLIST-FT) | First tour reenlistment rate |
| 7. | (TURNOVER) | Long-term stability of personnel |
| 8. | (COURT) | Court martial rate |
| 9. | (MANNING NEC) | Manning level ratio--describing the proportion of billets manned by qualified persons according to the NEC data system |
| 10. | (PASS RATE) | Percent of persons taking rating exams who pass |
| 11. | (REC/ELIGIBLE) | Percent of persons who are eligible by longevity who are recommended for rating |
| 12. | (COURSES) | Rate of correspondence course participation |
| 13. | (GROUP) | Rate of participation in group activities |
| 14. | (SICK RATE) | Number of times per man per ship per month sick call reports |
| 15. | (SACK TIME) | Percent time spent sleeping while off duty |
| 16. | (MORALE) | Rating of crew morale by top officers |

- | | | |
|-----|-------------------|--|
| 17. | (PERS CAPABILITY) | Overall rating of personnel capability by top officers |
| 18. | (LEADERSHIP) | Perceived leadership effectiveness by crew members |
| 19. | (FOOD) | Food and personal services evaluation |
| 20. | (DRUGS) | Reported drug usage |
| 21. | (ADMAT) | Overall Admat inspection grade |
| 22. | (DISCHARGE) | Discharges other than honorable (including reference to special BuPers Code) |
| 23. | (GRIEVANCE) | Grievances directed to others outside of command (e.g., Congress) |
| 24. | (MAINTENANCE) | Percentage of maintenance actions deferred due to insufficient manning or expertise (from 3M data system) |
| 25. | (TRAINED) | Percent of required training completed by officers |
| 26. | (TRANSFER) | Requests for transfer/man/unit time |
| 27. | (SAT-PA) | Satisfaction with present assignment (as measured by confidential questionnaire to sample of officers and enlisted) |
| 28. | (SAT-SM) | Satisfaction with shipmates (as measured by confidential questionnaire to sample of officers and enlisted) |
| 29. | (ENLIST-FIT) | GCT + ARI + Educational Level + Mean Semi-Annual Evaluation (all scores standardized) for all or for a sample of enlisted persons averaged across the unit |

These 29 components were named and listed in preparation for the next day's rating session. The second day of the workshop was devoted to two rating tasks. First, officer participants were asked to evaluate each component on five criteria of importance and utility for use in the status composite. The five criteria were: Importance; Reliability; Accessibility; Generalizability; and "Fudgeability". The purpose of obtaining these criterion ratings was to assess officers' perceptions of the "goodness" of each component. These opinions of component quality on a number of criteria enabled us to identify several components which showed greatest promise for contributing to an overall composite.

The second rating task required each officer to respond to one of two formats designed to estimate the intercorrelations among component measures. That is, instead of obtaining the empirical relationships among components by actually obtaining measures from a large number of ships and then computing their intercorrelations, officers were asked to provide estimates of these

intercorrelations. One of the formats required raters to picture a ship which stood extremely favorably along a particular component (1 of the 29). The rater was then asked to rate from 1 (extremely unfavorable) to 9 (extremely favorable) the probable standing of that ship along the other 28 components. The other format was identical except that the rater was asked to picture a ship which stood extremely unfavorably on a particular component.

This rating task provided a relatively uncomplicated method for obtaining each rater's estimate of the relationships among components. Furthermore, estimates were received from a number of officers independently and from two separate rating formats.

Criterion ratings were examined for the total list of 29 components and the 14 most promising were chosen for further investigation. In addition, the estimated correlations among all components were arranged in matrix form. Crude estimates of inter-rater agreement with respect to the independent rater estimates of the relationships were computed. The overall intra-class coefficient of agreement proved to be .63.

As an extremely tentative step toward exploring the possible dimensionality of the measurable personnel status domain, the correlation matrix generated by the estimates of the relationships among components was factored. For this analysis, only those 14 components to be investigated further were used. A principal components factor analysis was performed and the first five factors rotated using the varimax criterion. Although we must keep in mind the source of the original "correlations" on which this analysis is based, the results do suggest very meaningful clusters of components.

Factors

- I - Fitness and Readiness of Individuals
- II - Discipline
- III - Crew Member Attitude Toward Officers and the Navy
- IV - Free Time Activities
- V - Manning Level

Again, it must be emphasized that these factor analysis results are based on data from a correlation matrix generated in a very unusual manner. Yet, the results do suggest that it may be meaningful and useful to represent a status construct in terms of multiple dimensions of the type appearing above.

One hundred ships differing on the 14 components have now been generated by computer and will now be presented to panels of Naval experts for overall judgments of each "ship's" personnel status. An example showing four of the ships so generated is given on the following page.

In general, the data analysis will involve computing multiple regression equations for each officer in the rater group. Each equation will represent that rater's policy related to assessing the personnel status of ships. Then, we will use JAN (Christal, 1963; 1968; Naylor and Wherry, 1965) and perhaps the pm statistic to assess the similarity in raters' policies. Other analyses will be performed as necessary to develop inferences about the nature of the officer groups' composite policy, and about the importance of each component in Naval officers' minds for determining the state of the personnel subsystem aboard ships.

- iii. Implications. We believe the procedures described above have a direct "carry-over" for the development of broader indexing procedures for total organizational effectiveness measures in the Navy and various Naval subunits. Obviously the steps mentioned to this point do not yield the finished product; however, additional steps to validate the final indexing procedures are suggested in the Borman & Dunnette (1974) report. The reader is referred to that report for these suggestions.

d. Multivariate and policy capturing analyses of measures developed from naturalistic observation studies in 2. We do not suggest here any set of studies differing methodologically from 3a, 3b, and 3c above. However, the input of variables may differ and they may be more directly relevant to process parameters than to the more heavily goal oriented variables we have discussed so far.

- i. Objectives. The purposes are:

- . to examine protocols of organizational episodes gathered in 2a, the goals derived in 2b, and the critical incidents and dimensions derived in 2c for common elements and for areas not presently sampled by existing measures.
- . where necessary, to develop and examine psychometrically measures and/or new reporting systems to tap elements pinpointed above.
- . to determine the convergent and discriminant validities of the measures and/or reporting systems so developed.

SHIP NUMBER 001 (NO)	
COMPONENT	SCORES
REENLIST-FIT	****4
UAR	***3
REENLIST	****4
ENLIST-FIT	****4
TURNOVER	*****6
LEADERSHIP	***3
SAT-PA	***3
MAST	**2
MANNING-NEC	****4
COURSES	***3
DISCHARGE	*****5
MAINTENANCE	****4
PASS RATE	****4
SACK TIME	*1

SHIP NUMBER 002 (NP) 255.	
COMPONENT	SCORES
MAINTENANCE	****4
REENLIST	***3
ENLIST-FIT	**2
SACK TIME	*****5
MANNING-NEC	***3
DISCHARGE	*1
MAST	*1
TURNOVER	*1
PASS RATE	*****6
UAR	*1
COURSES	*****7
LEADERSHIP	****4
REENLIST-FIT	***3
SAT-PA	*****5

SHIP NUMBER 003 (NQ)	
COMPONENT	SCORES
REENLIST-FIT	*****9
MAINTENANCE	*****7
REENLIST	*****9
COURSES	*****9
PASS RATE	*****7
MANNING-NEC	*****5
SAT-PA	*****6
MAST	***3
LEADERSHIP	*****8
SACK TIME	*****9
TURNOVER	*****8
DISCHARGE	*****6
UAR	*****5
ENLIST-FIT	*****8

SHIP NUMBER 004 (NR)	
COMPONENT	SCORES
MANNING-NEC	*****6
REENLIST-FIT	*****5
UAR	*****5
DISCHARGE	*****5
COURSES	*****8
SACK TIME	*****6
MAST	*****5
ENLIST-FIT	*****8
LEADERSHIP	*****6
REENLIST	*****7
MAINTENANCE	*****8
PASS RATE	*****9
TURNOVER	*****5
SAT-PA	*****6

- ii. Procedures. The procedures for accomplishing the above objectives would include essentially the same analytical steps as those already described in 3a, 3b, and 3c. In other words, these "new" measures would be examined via multi-method, multi-construct analyses, and multi-dimensional and policy capturing procedures as described previously. When some subset of measures has been sufficiently "purified" and made reasonably accessible for continuing data collection, policy capturing and multi-dimensional scaling can, of course, be applied to real data gathered from Naval units instead of providing so-called mockups as mentioned in 3c.

4. Experimental and quasi-experimental investigations. The "lever" side of organizational effectiveness; that is, learning what and how organizational actions or interventions may affect the nature of outcomes (goals) and/or the nature of organizational processes is most likely to be learned with greatest precision by conducting experimental investigations. In the classic experimental paradigm, one first establishes the dependent and independent variables of interest and decides how they are to be measured or varied. Subjects are then chosen randomly from some larger and defined population and assigned by random means to two or more subgroups. Different "treatments"--representing different aspects of one or more of the independent variables--are then applied to the various groups while one or more groups remain "untreated"; that is, they serve as "controls" for the experimental procedure. Judiciously timed measurement of the dependent variable across the several groups and analysis of differences among the measurements yield inferences about the causal effects of different levels of the independent variable on the dependent variable.

Though elegant in conception, the above paradigm is exceedingly difficult to apply in actual field settings because of the experimental requirements for random selection and assignment of subjects and because of the likelihood of any other number of uncontrolled and unplanned "interventions" occurring differentially across groups to obfuscate the interpretation of results. The usual solution has been to "stage" laboratory experiments where things can be controlled much more fully. Such laboratory studies have proved exceedingly fruitful in helping to define parameters to be studied and in aiding, thereby, the development of theory. In particular, laboratory studies and simulations have proved useful in the area of equipment design and in answering human factors questions. However, "removal" of persons to a laboratory setting for studying organizational effectiveness is somewhat more risky because the generalization of findings back to field settings will usually seem tenuous at best. The goals and processes of an

organization of persons working in a laboratory may differ quite substantially from the goals and processes of organizational units in the real Navy. Clever simulations and care in generalizing can, of course, still yield good information, and we suggest an approach below that Naval researchers may wish to undertake.

However, in the field settings of the Navy, a better alternative will usually be one of being on the alert constantly for the opportunities to carry out quasi-experimental investigations. Of the several approaches mentioned by Campbell and Stanley (1963), Cook and Campbell (in press) and Campbell (1969), two seem most likely to yield good information for understanding different facets of organizational effectiveness in the Navy. These designs are the "interrupted time series design" and the "regression discontinuity design" these two designs and some possible approaches with them also are discussed in regard to their possible use in the Navy on the pages that follow.

First, we wish to remind the reader that the dependent variables of interest, their measures, and their psychometric qualities will for the most part have been derived from studies already suggested under Sections 2 and 3 above. In particular, to the extent that dimensions of organizational effectiveness in the Navy have been defined and various indexing procedures derived for measuring them on a continuing basis, these will serve admirably as the dependent variables to be analyzed via the experimental and quasi-experimental procedures suggested below.

a. Contrived organization studies. The idea of using contrived organizations may, at first blush, seem too "wild" to consider seriously. But we believe the potential for increased understanding of organizational effectiveness may be great; therefore, we outline here the broad sketch of an idea and will depend upon those who are in positions of policy decision making responsibility to consider the practical and fiscal difficulties of undertaking such experiments within the Navy.

i. Objectives. The objectives of this research suggestion are many, but basically they revolve around the following rather broadly stated purposes:

- . To establish long-term operational Naval units for the sole purpose of studying experimentally different aspects of organizational effectiveness;
- . To evaluate dependent measures of organizational effectiveness (developed from 2. and 3. above) within the context of the Naval model mentioned in 1. but with the special advantages to be derived from working within a research setting which is less subject to unplanned interventions; and,

- . To study the variation and change in dependent measure as functions of independent variables or interventions that would be applied within the paradigm of the full experimental design methodology so that causal statements and tests of the Naval model may be appropriately made.
- ii. Procedure. Basically the idea is to establish an actual operational "arm" (NAVORGEFF) of the Navy which would exist solely for the purpose of carrying out research studies on organizational effectiveness. The duty assignments of persons assigned to NAVORGEFF would not be unique. In fact, those duty assignments with special importance or which are of particular relevance to representing the functioning of the Navy would be chosen. In other words, we are not suggesting that the sole function of persons assigned to NAVORGEFF would be to serve as "guinea pigs" for this research program. In fact, they would be performing their usual functions according to their training and billet assignments. They would, however, be "protected" from the unplanned interventions of circumstance and could, therefore, be expected to yield firm conclusions about the impact of planned interventions on organizational effectiveness. Obviously, we are hard put to specify the exact complement of manpower to be assigned to NAVORGEFF, but we would hope that once it is fully manned, it would consist of approximately 500 separate organizational units of from 3 to 20 persons each for a total complement in the neighborhood of 4,500 to 5,500 persons. It is anticipated that this be a permanent part of the Navy and that various units may be assigned to it or moved out of it as may be required by research activities and research questions.

Campbell (1969) has discussed the "experimenting society" and the concept of the "experimental administrator." In effect, we are suggesting an "experimenting Navy" commanded, if you will, by an "experimental admiral."

After the new organization had been operational for a sufficient period of time (say 18 months to two years), many of the studies already outlined above--especially 2a., 2c., 3c., and 3d. would be applied to the units of NAVORGEFF. The hope, of course, would be that this "experimenting Navy" through steps of naturalistic observation, critical incidents methodology, and policy capturing strategies, would yield results essentially equivalent, but in microcosm, to the results derived from the data gathering processes, in

the other operating units of the Navy. If so, we would gain greatly increased confidence about the utility of using NAVORGEFF for studying experimentally the effects of changes and organizational interventions on dependent variables of consequence and its utility also for testing various elements of the Naval model of theory of organizational effectiveness mentioned in 1. above.

At that time (i.e., after the dependent variables had been developed and determined to be generalizable to NAVORGEFF and interchangeable with the Navy-in-general), experimental interventions of interest would be introduced randomly within subunits of NAVORGEFF. We cannot specify the nature of such interventions here for they would, of necessity, be determined, in part, by the Naval model of organizational effectiveness and, in part, by procedures, policies, practices and the state of behavior science knowledge three to five years from now. Merely as suggestions, we would assume that such matters as organizational climate, leadership style, and many different OD-type interventions might be investigated (much in the vein of the Litwin-Stringer and Frederiksen studies which already have been reviewed).

- iii. Implications. Though ambitious and "blue skies," the implications of such an experimental total push effort as this are so great as to defy enumeration. Quite simply, the approach--over a span of perhaps ten to fifteen years of operation--would do more to define the parameters of organizational effectiveness than anything that we can envision. In a very important way, the implications of such a program of research are as great for the Navy and for behavioral science in general as the brilliant series of long-term longitudinal research efforts of The Management Progress Study³ have been for the study of managerial effectiveness and its correlates.

b. Natural experiments using interrupted time series. In working with intact organizational groups as the unit of analysis, experimental manipulations are often difficult or impossible because a change or "reform" is usually put into effect across the board rather than for subsets of individuals within the organization. Within any particular organization experiencing the change, therefore, the only comparison base for the dependent variable(s) is its record for a period of time prior to the intervention. The interrupted time series is a quasi-experimental design which depends on the careful analysis of the records

³Bray, D. W., Campbell, R. J., & Grant, D. L. Formative years in business: A long-term AT&T study of managerial lives. New York: Wiley-Interscience, 1974.

of the "state" measures of the organization before and after a change is instituted. An example of such a record is shown below as Figure 10 from Campbell (1969).

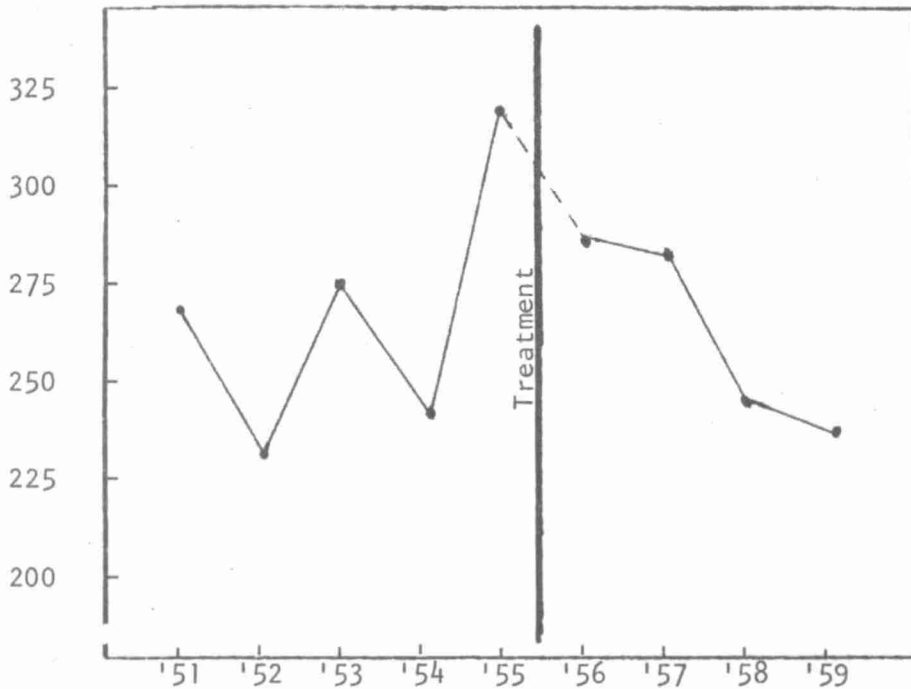


FIG. 10. Connecticut traffic fatalities. [The so-called "treatment" in the chart above was in the form of a severe and sudden crackdown on speeding violations in the state of Connecticut. A similar, though much larger, natural experiment is occurring currently in this country in the form of reduced speed laws due to the energy crisis. Early indications are that traffic fatalities have declined--though, as with nearly all quasi-experimental studies, results are difficult to interpret directly as being due only to reduced speeds. The actual number of miles driven may also have been curtailed; the locus of driving patterns (e.g., urban vs. rural) may have changed; and, more small cars may be in use (which, if true, would confound the results due to the larger fatality rates common to small car accidents as compared with those involving large cars). Even so, the interrupted time series can be a powerful design for deriving causal inferences when it is applied and analyzed by clever and knowledgeable investigators.]

i. Objectives. The purposes of this approach are simply:

- . to examine Naval records of dependent variables before and after organizational changes are instituted in order
- . to derive or at least come a step closer to causal inferences about the effects of the independent variables (the changes) on the dependent variables.

ii. Procedure.

- . First, of course, it is necessary that Naval units utilize in a systematic and continuing way some, if not all, of the dependent indicators or "state of the system" variables discovered and developed as a result of the research suggestions in 2. and 3. above.
- . Second, it is equally important that careful records be maintained of changes within Naval units which reflect in any way the kinds of independent variables we have discussed previously in our review of the literature. Or, for that matter, it is also important to keep track of changes that, at the time of their initiation, were believed or justified by policy makers in the name of expected effects on the unit's organizational effectiveness.
- . Analysis of these sets of records would then be carried out in the manner described by Campbell (1969); essentially the analysis simply takes the form of pre-post comparisons on the dependent measures. Readers of the present monograph are urged to reread Campbell's seminal article. We mention here only a few of the more important "cautions" he mentions in relation to the appropriate interpretation of such interrupted time series information: (a) It is important that the time series be studied over an extended period of time in order to be able to rule out effects due to maturational changes in the system or due to regression effects (effects that only "seem" to show improvement because the initiation of the change or intervention may have been a cosymptom of the treated group's condition--in other words, certain units receive OD "treatments" because they appear "sicker" to begin with); (b) It is important to be certain that the measuring system is the same throughout the analysis of the extended time series (for example, occasionally an integral part of a change is a change in the nature of the

record keeping system--e.g., the collection of crime statistics.); (c) Multiple measures should be accumulated and studied to examine the possibility of unwanted side effects occurring; (d) Gradual changes should not be a subject for study because it is too difficult to fix properly the actual point in time for the pre-post comparison; thus, the changes should be the result of abrupt and decisive actions rather than the gradual or piecemeal institution of interventions or "reforms"; and, (e) All Naval units should be examined to discover similar ones to those in which changes were instituted, and these may then constitute comparison units--natural occurring control groups, as it were. [In fact, it will be remembered that several states passed 55 m.p.h. laws late in 1973 before the institution federally induced lower speed limits. This provided a number of states for use as untreated comparison units. Statistics publicized at the time were interpreted as showing reduced fatality rates in those states which imposed the earlier laws directed at reduced speeds.]

- iii. Implications. The implications need not be specified in any singular way. Quite simply, they involve the better understanding of the causal consequences of the "lever" or independent variable side of the organizational effectiveness equation.

c. Natural experiments using regression discontinuity design. When some administrative basis is being employed for selecting organizational units to receive or not receive a "reform" or treatment, units scoring at or very near to the region of the cutting score should be randomly selected for the treatment. A graphic illustration of this particular design is shown below modified from Figure 11 in Campbell's 1969 article:

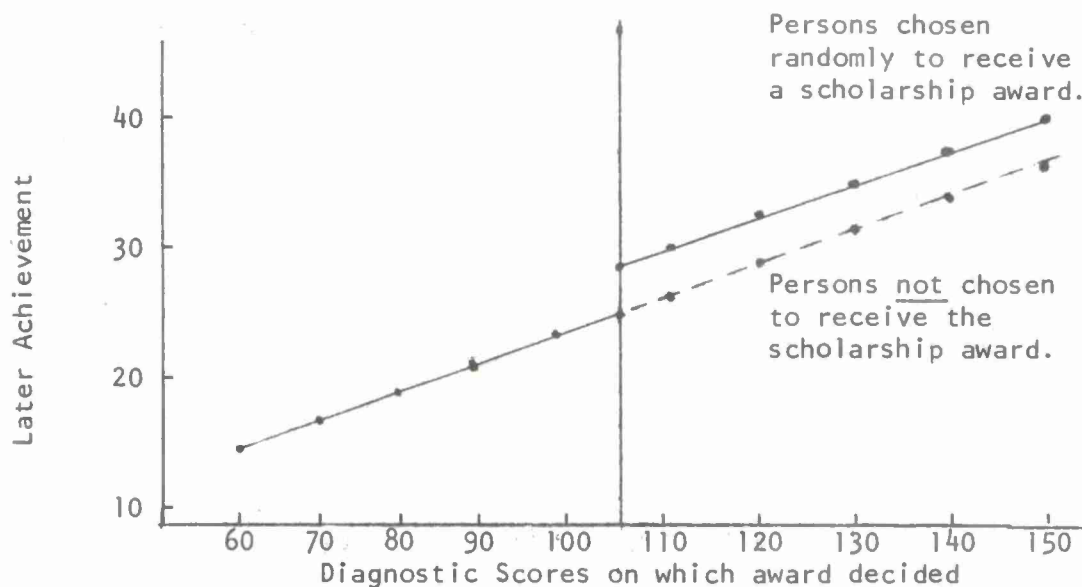


FIG. 11. Tie-breaking experiment and regression discontinuity analysis. [The above chart illustrates the fact of a fairly substantial relationship between status on the Diagnostic Scores and later achievement. However, it also shows that granting a scholarship award to a random subset of persons scoring at or above the Diagnostic Score of 105 was accompanied by an apparent substantial boost in the level of achievement attained by those persons.]

i. Objectives. The purposes of this approach are the same as those specified for the interrupted time series analyses with the additional purpose, however.

- . To examine systematically the potential organization effectiveness effects of those organizational programs which may be in short supply or which may be too costly for Navy-wide implementation in order to provide a more informed data base for deciding in favor of or against wider implementation.

ii. Procedures. We shall not specify here any specific research plan because we are, at this stage, unaware of the many situations which must exist in the Navy where the regression discontinuity design would be applicable. Thus, we offer here only a single hypothetical example. Let us imagine that a particular new team development approach has been put together and that it involves two weeks' time of all persons assigned to any particular organizational unit receiving the "treatment." Moreover, it is believed that

many units may not need nor would they profit from the new approach unless they score below a certain score on some "state of the system" index or diagnostic indicator which we shall call Quality of Group Interaction.

The procedure would, in effect, then identify some subset of units scoring at or below this particular cutting score. A smaller subset of those units would be randomly selected and assigned to receive the new team development approach--and, of course, all units would continue to be "tracked" in order to determine the effects on both the Quality of Interaction variable and other dependent variables currently in use in the Naval organization.

- iii. Implications. The implications of using this design, like those of the previous quasi-experimental procedure need not be specified apart from the valuable information to be gained about possible causal effects of organizational interventions on unit organizational effectiveness in the Navy.

We hope we have been able to convey the flavor of experimental and quasi-experimental investigations which might be undertaken in the Navy and which, with astute observation and data gathering methods, can lead to reasonably accurate causal inferences about linkages between organizational effectiveness and various independent variables, "treatments," and interventions. We have necessarily been sketchy and somewhat incomplete in these suggestions, but we offer them merely as methodological illustrations of what can be done rather than as completely specified and substantively defined plans of research.

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